ESSAYS ON HOUSEHOLD BEHAVIOUR AT THE INTERSECTION OF CONFLICT AND NATURAL DISASTERS: THE 2010 FLOODS IN PAKISTAN

Yashodhan Ghorpade

Doctor of Philosophy in Economics

Institute of Development Studies

University of Sussex

October 2015

Thesis Summary

This thesis examines household behaviour at the intersection of natural disasters and conflict. I structure this research around four distinct analytical chapters that use empirical microeconomic analysis to study household-level decisions and outcomes in the year following the 2010 floods in Pakistan.

I first examine how does conflict affect household access to cash transfer programmes, and what mechanisms explain such effects. Using IV estimation to overcome endogeneity of conflict exposure and cash transfer receipts, I find that conflict reduces household and community level access to two large cash transfer programmes in Pakistan. The effects are driven by the likely presence of armed rebel groups who possibly resent state-led efforts to win legitimacy through social protection programmes. Next, I examine the effect of conflict on household access to remittances. I use IV estimation to overcome the endogeneity of conflict and remittance receipts and find that conflict exposure reduces household remittance receipts. This effect is driven by security threats associated with armed group presence, which threatens the operations of informal money transfer agents. Further, I find evidence for conflict negatively affecting investment-focused remittances as the effects of conflict are strongest among households more likely to use remittances for investment, than for consumption. These findings are in contrast to the macro literature that tend to view conflict as a factor that affects altruistic motives of remittances but has not examined investment motives in detail.

In my third analytical chapter I examine the unintended effects of household aid receipts on violence through a mechanism that has not been studied in much detail: civilian militarisation through the purchase of guns. Using propensity score matching to overcome selection bias, I find that overall, flood relief cash transfers did not lead to any increases in household gun ownership. However recipients who own large tracts of land and live in conflict-affected areas were 8.3% more likely to acquire a gun, compared to a matched group of non-recipient households. The effects are driven by households that lived in displacement camps, which may have enhanced security concerns and the need for guns. This suggests that for groups that have low material but high security needs, exogenous increases in cash, through cash transfers, can increase the likelihood of acquiring guns for use, or for signalling, as a safety good.

Finally, I examine the under-studied role of uncertainty of disasters in affecting post-disaster short-term migration decisions. I find that while flooding exposure increases the propensity to migrate, a higher level of uncertainty, represented by more anomalous floods (compared to recurring floods), decreases migration. I also develop a measure of flooding anomaly, based on the likely past exposure to floods at the community level, using satellite data on long term precipitation levels, and distance to the nearest rivers.

My research examines important, but hitherto under-studied and challenging relationships that play out in complex emergencies, where many households simultaneously face flooding and violent conflict shocks. The findings are relevant for economic theory, empirical analysis and for policy.

Table of Contents

Acknowledgments

First of all, I would like to thank my supervisors at the Institute of Development Studies, Patricia Justino, Jean-Pierre Tranchant, and Jaideep Gupte for their unstinting support, encouragement, patience, and indulgence at all times over the last four years. I deeply appreciate how much, and how well they pushed me to do better. Their unwavering faith in my work (and through that, in me), at several moments when I saw little reason for it, played no small part in getting this thesis to a satisfactory completion. I am also grateful to Papa, Kaku, and the rest of my family, between Delhi, Dubai and Cupertino for their love and support at all times.

I gratefully acknowledge the financial support I received during my PhD from TAMNEAC, a Marie-Curie Initial Training Network of the European Commission's Seventh Framework Programme. TAMNEAC was the perfect platform to connect with other researchers on the microeconomics of conflict, and I benefitted immensely from the many travel and learning opportunities it provided. I am grateful for a doctoral student fellowship from the Institute of Development Studies, which enabled me to write Chapter 5 of this thesis and was supported through a sub-award from the University of Maryland as part of a grant from the Air Force Office of Scientific Research (#FA9550-14-1-0353), funded by The Minerva Initiative of the U.S. Department of Defense. Debbie West, Becky Mitchell, and Marion Clark provided amazing administrative support; I thank them for their help at every point.

I thank Oxford Policy Management Ltd., in particular Simon Hunt, Tom Newton-Lewis, and Sean O'Leary for providing me access to household survey data for analysis, and for patiently responding to my many requests for guidance. I would like to thank Dr. Ajai Sahni at the Institute for Conflict Management, New Delhi for his patient guidance, and encouragement, which helped me access and use data from the South Asia Terrorism Portal.

As part of the TAMNEAC fellowship, I spent an instructive year as a visiting research fellow at the Development Strategy and Governance Division at the International Food Policy Research Institute, Washington, D.C. I thank Paul Dorosh and Sohail Jehangir Malik for providing me this opportunity. I am indebted to colleagues and friends at IFPRI, in particular Katrina Kosec and David Spielman, who provided critical inputs and feedback that tremendously helped improve my research. I am also thankful to Valerie Muller, Jean-Francois Maystadt, Neha Kumar, Syed Hamza Haider, Fatima Zaidi, Madeeha Hameed, Madiha Afzal, and Purnima Menon for their enabling engagement with my work.

At the University of Sussex, I thank Vikram Pathania and Catherine Muller for their feedback on my work, and for their friendships. I thank Sanchari Roy for her helpful comments on Chapter 6.

Not being able to visit Pakistan whilst writing a PhD thesis on the country could have been as academically damaging as it has been personally dispiriting; but for the generosity with which many knowledgeable scholars of Pakistan, at IDS and beyond, provided me invaluable information and insight, forging deep friendships in the process. I remain indebted to Shandana Mohmand, Mujtaba Piracha, Haris Gazdar, Rehan Rafay Jamil, Aimen Majeedullah, Mir Dosteen Hoth, Miguel Loureiro, Muhammad Rahimuddin, and Ammar Rashid, for giving me the opportunity to listen.

I wouldn't have been able to complete, or at least enjoy (as much as I have), this PhD without the company, affirmation, humour, and levity that my partner-in-crime (and conflict), Alia Aghajanian brought to the last four years. I am so glad we went through this together!

I also thank the many friends I made over the years at IDS, who ensured that the PhD process remained such a lively experience. I sincerely thank Eric Kasper, Aditya Vansh Bahadur, Ana Solorzano-Sanchez, Aparna John, Nikhil Wilmink, Hani Morsi, Maysa Shqerat, Hadeer El Shafie, Maria-Teresa Armijos, Syed Shahid Abbas, Rachel Godfrey Wood, Elizabeth Mills, Shilpi Srivastava, Marika Djolai, Ricardo Santos, Aaqib Khan Khetran, Katia Taela, Ewan Robinson, Kas Cascant-Sempere and Sophie Valeix. I also thank Angela Dowman for her excellent support to all PhD students at IDS. At the Economics Department, I would like to thank Mattia di Ubaldo, Marco Carerras, Matteo Sandi, Subhani Jinasoma Keerthiratne, Egidio Farina, Francisco Cabrera, Javier Lopez-Gonzalez, Lee Crawfurd, Amrita Saha, Cecilia Poggi, Eva-Maria Egger, Ani Rudra Silwal and Nihar Shembavnekar. Within the TAMNEAC programme, Juan Carlos Munoz-Mora and Kari Lipschultz have been particularly helpful colleagues and are great friends.

I am glad that many of my former colleagues and mentors have remained in contact. I acknowledge with deep gratitude, the guidance I have received even during these PhD years from Puja Vasudeva Dutta, Bart Minten, Vegard Iversen, Arjan Verschoor, Kunal Sen, Pooja Sharma (Womslet Shilla), Sanjay Kaul, Sangeeta Goyal, and Madhulika Sen.

The last four years have thrown up many challenging and even difficult moments, for which, in hindsight, I am grateful. Through all of this, and more, the friendships that I deeply value have helped me stay collected and retain a sense of balance. Nivriti Butalia has constantly and simultaneously been sounding board, contrarian and echo chamber, as required, and otherwise. I marvel at her compassion and perspicacity, which egg me on to try to live a fuller life. I deeply thank my close bunch of college friends, the Rawalpindi Express – in particular, Uday Bhatia, Supriya Bhutani, Shruti Rajagopalan and Ruchika Khattar. I feel deep gratitude for the support of several friends at critical times over this PhD process, some of whom I have named already; and among the rest: Niharika Pande, Vidur Chopra, Louise Cornell, Shivani Mathur, Karan Budhiraja, Arjun Sagar Gupta, Amit Agarwal, Jaydeep Dharap, Prasad Gadgil, Richa Singhal, Amruta Patil, Amit Kanvinde, Madhav Raina-Thapan, Paul Clist, Paroma Mukherjee, Aditi Thorat, Owen Mortimer, Swapna Kona-Nayudu, Sakshi Bhalla, Trishima and Ben Mitra-Kahn, Siddharth Garg, Varun Khemka, Zhen Liu, Vivek Mansukhani, Arunaman Sharma, Simi Batra, and Nandakumar Rajagopalan.

I am grateful to Mick Moore at IDS, and Manjula Kumar at the Smithsonian Institution for giving me the opportunity to pursue my passions, tennis and theatre, during this PhD. I thank Rohini Prasad for hosting me so graciously for several weeks in Paris this summer (when my thesis finally came together), and for her stellar friendship.

I dedicate this thesis to the memory of my mother, Poonam Ghorpade, who would have been so happy to see me here today.

Yashodhan Ghorpade
October, 2015

Abbreviations

ATET	Average Treatment Effect on the Treated
BISP	Benazir Income Support Programme
CBPS	Covariate Balanced Propensity Score
CDCP	Citizens Damage Compensation Programme
FAI	Flooding Anomaly Index
FATA	Federally Administered Tribal Areas
FDI	Foreign Direct Investment
FEI	Flood Exposure Index
GDP	Gross Domestic Product
GoP	Government of Pakistan
GW	Giga Watt
ID	Identification Document
IDP	Internally Displaced People/ Persons
ISI	Inter-Services Intelligence
IV	Instrumental Variable
KM	Kilometre
KPK	Khyber Pakhtunkhwa
ln	Natural logarithm (base = e)
NADRA	National Database Registration Authority
NASA	National Aeronautical and Space Agency
NATO	North Atlantic Treaty Organization

NGO	Non-Governmental Organization
NWFP	North-West Frontier Province (now Khyber Paktunkhwa)
ODA	Overseas Development Assistance
OLS	Ordinary Least Squares
PKR	Pakistani Rupee
PPP	Pakistan People's Party
PSM	Propensity Score Matching
PSU	Primary Sampling Unit
TTP	Tehrik-e-Taliban Pakistan (Pakistani Taliban)
UAV	Unmanned Aerial Vehicle
US	United States (of America)
USD	US Dollars

Glossary of Local Terms

Hawala	Informal money transfer system prevalent across much of South Asia, Middle-East and East Africa
Hawaldar	Hawala (informal money transfer system) operator
Hundi	Same as Hawala (used in South Asia)
Jihad	Holy War
Mohajir/ Muhajir	Immigrant, used to refer to (the largely Urdu-speaking) Muslim communities that migrated from India into Pakistan during the partition of India in 1947
Mujahideen	One engaged in Jihad (plural of *mujahid*)
Pashtun	Pashtun ethnicity, often coinciding with speaking Pashto language
Pathan	Same as Pashtun
Tehsil	Sub-district, unit of administration between District and Union Council
Watan	Popular name of the Citizens Damage Compensation Programme Flood Relief Cash Transfers, or the card used to access it. Literal translation – Nation

Chapter 1. Introduction

This thesis examines household behaviour at the intersection of natural disasters and conflict. While existing branches of development microeconomics literature have examined, in detail, the effects of exposure to natural disaster shocks, and to violent conflict on households, few studies have examined the overlap of these sources of vulnerability – which is acutely felt at the household level. In 2010, much of Pakistan witnessed intense and unprecedented flooding, even while several parts were reeling under a decade-long exposure to varying levels of violent conflict. Pakistan, in the year following the 2010 floods, offers a unique empirical setting in which to study the overlap of conflict and natural disasters, and what it implies for households. Making use of this opportunity to learn more about the intersection of vulnerabilities, I structure this research around four distinct analytical chapters that use empirical microeconomic analysis to study household-level decisions and outcomes in the year following the 2010 floods in Pakistan.

The remainder of this introduction is organised as follows: Section 1.1 describes the academic and personal motivation for this thesis; 1.2 outlines the overarching analytical approach; 1.3 provides context to discussions of the Pakistani economy and state during and prior to the floods; 1.4 describes each of the research questions that this thesis seeks to answer as sequential chapter outlines; and finally, 1.5 makes connections across the chapters to crystallise the broader contributions of this thesis into a better understanding of economic relationships in the aftermath of the 2010 floods in Pakistan.

1.1 Academic, and Personal Motivations

I started this PhD in the autumn of 2011, a year after enormous and devastating floods hit Pakistan, the worst the country had experienced in decades. The research consultancy I was working for then had been commissioned by a consortium of multilateral donor agencies to conduct a rapid assessment of the effects of the floods on household welfare, and of the immediate relief operations of the Government of Pakistan. I expressed a desire to be part of the project because of my keen interest in studying household behaviour under duress and in Pakistani society, culture and politics. I was eager to use the opportunity to contribute meaningfully, even if modestly, to the unfolding crisis in the only way I could: with some analytical skills, and a passion for strengthening the evidence base for on-ground action. My previous work at the World Bank on social safety nets in South Asia had given me a flavour of the rapidly transforming political economy of social protection in Pakistan, following the restoration of democratic rule in 2008 after nearly a decade under military dictatorship. I believed that such work experience, a short research and publication record on coping strategies in response to economic shocks, and a familiarity with the language, culture and politics would hold me in good stead to be deployed for the rapid assessment. I had, of course, naively underestimated the effect of carrying an Indian passport.

No sooner had I started looking at flight connections between New Delhi, India and Multan, Pakistan, was I told that the project could not risk taking an Indian national on board, for security reasons. The indulgence of the visa gods could hardly be expected in a humanitarian crisis requiring an immediate despatch of evaluation teams. More generally, I was advised that as an Indian I would never really be able to research Pakistan. Never intending for it to be so, this thesis is perhaps my (slightly delayed) response to the genuinely well-meant advice.

Obstinacy, to some degree may be necessary, but is certainly not sufficient for motivating (and completing) a PhD thesis. As I settled into my PhD at the Institute of Development Studies at Sussex University, I savoured the academic space and freedom to determine my own research agenda, rather than following the diktats of a Terms of Reference to which I had grown to be accustomed. This freedom enabled me to engage with a vast evidence base in the development economics literature on the impact of natural disasters on household behaviour, welfare and human development. My involvement as a research fellow with the Training And Mobility Network for the Economic Analysis of Conflict (TAMNEAC) also introduced me to a nascent but rapidly growing body of literature on the economic impact of violent conflict on households. As my engagement deepened, I recognised the importance of both these lines of inquiry, but was also increasingly cognisant of the silence that marked the conversation between them. I recalled that in Pakistan, even as the global media had reported that militant groups were stepping in to provide relief and assistance to flood-hit communities, the national and international post-disaster response followed a usual pattern, as though operating in a completely peaceful country. This had serious policy implications, as disaster relief efforts faced challenges peculiar to a conflict setting, that standard disaster response approaches did not countenance: limited reach, physical threats to aid workers and competition from militant groups to reach populations, to name a few. I became interested in how conflict affects the actions of households, the state and non-state groups in the aftermath of natural disasters and found the extant academic engagement with the intersection of such vulnerabilities inadequate.

This reflection motivated me to pursue my research on the intersection of economic shocks and exposure to conflict, and further, in examining how such an intersection shapes the actions of public and private actors. The context of the 2010 floods in Pakistan, still very fresh in my mind, against the backdrop of the country's decade-long and continuing tryst with very high levels of violent conflict across vast areas, was a ready and familiar, yet challenging case study to situate my research in.

1.2 The Overarching Approach

This research is situated in the field of development microeconomics. I focus on the empirical analysis of household survey data to answer distinct questions on household decision-making and welfare, simultaneously engaging with the microeconomic theory and seeking to draw lessons for policy.

In my thesis I examine household behaviour in the year following the 2010 floods in Pakistan. I attempt to engage with this topic beyond the more common focus on coping strategies alone; using the episode of the flood shock as a snapshot view of how household behaviour was determined not only by the risk and uncertainty of flooding exposure, but also by the political and institutional environment, policy interventions and the historical and cultural predispositions of households and communities.

Keeping the household (and in some cases the individual) as the central unit of analysis, I attempt to study economic behaviour and decision-making at the intersection of the actions, inactions, and the interactions of, chiefly among others, the forces of nature, the welfare state, armed rebel groups, and historical socio-economic and political trajectories. Equally important is how households' own characteristics – income, wealth, occupational status, demographic composition and social identity, influence their response to external stimuli, and their interaction with the economic and socio-political environment in a post-flood setting.

There is a co-dependence between the effects of natural disasters, aid programmes, and the (often violent) interaction between state and non-state actors, on households – indicating a complex structure of mechanisms that determine household decisions and welfare. Some of these inter-relationships are better understood than others. For example, a vast literature examines how households cope with shocks induced by natural disasters using a wide array of coping strategies (Fafchamps, 2003; Dercon, 2002), and invoking the role of public policy to support household coping, in the form of social protection and disaster relief. Yet other studies examine how households cope with direct exposure to conflict (Verwimp et al., 2009; Ibanez and Moya, 2006; Brück, 2004a,b). I attempt to go beyond this well-trodden ground and focus on four distinct critical but under-studied mechanisms that operate at the intersection of natural disaster and conflict.

In my first analytical chapter (Chapter 3) I examine the causal effect of conflict on households' access to aid in the aftermath of the 2010 floods, and the channels through which conflict affects such access. While aid is important from a human development standpoint for households facing shocks, and is seen as politically important for the state in a conflict-affected setting, there is no evidence on whether and how conflict may undermine the household-level provision of aid.

Next, in Chapter 4, I examine how conflict affects household access to private transfers in the form of remittances, which can offer critical support in times of calamity. Country-level studies view conflict as a source of hardship and therefore a propeller of altruistic remittances. However, there is no microeconomic evidence to examine if conflict exposure at the local level, by sending a negative signal to investment-focused remittances, can potentially reduce remittance receipts at the household level. I specifically examine this question to assess whether conflict tends to isolate households from private transfers.

In my third analytical chapter (Chapter 5), I examine whether aid can unintentionally increase the likelihood of future violence through a route that has not been explored previously – civilian militarisation through household purchases of guns.

Finally in Chapter 6, I examine whether the likely past exposure to floods affects the propensity to migrate in the aftermath of floods. Coping strategies may often develop in response to previous shock exposure and therefore a known level of shock risk. However, there is no evidence on whether the degree of uncertainty – distinct from risk – in the form of the extent of flooding anomaly (or the novelty of flooding exposure in 2010 relative to the past) affects coping behaviour – in this case, the propensity to migrate.

The four chapter motivations above highlight important gaps in the microeconomic literature on household behaviour in complex emergencies – where households face multiple sources of vulnerability. The aim of the thesis is not to lay bare the entire web of connections between all actors, but to focus on specific research questions that can potentially shed light on some of the more interesting, hitherto under-studied, and challenging relationships. The rationale for focusing on specific causal relationships, sequentially, is echoed in noted economist Dani Rodrik's recent reflections on the elusive quest for the definitive/ right model to explain the complexity of the social world, prevalent among many contemporary economists and social scientists:

> "… [U]nderstanding requires simplification. The best way to respond to the complexity of social life is not to devise ever-more elaborate models, but to learn how different causal mechanisms work, one at a time, and then figure out which ones are most relevant in a particular setting."

Prof. Dani Rodrik[1]

John F. Kennedy School of Government, Harvard University

I therefore structure my thesis around four distinct but inter-related analytical chapters (Chapters 3 – 6), which enables the necessary analytical breadth to study distinct causal links that simultaneously operate in a complex setting. I also include a detailed descriptive chapter, outlining data sources and trends of conflict in the years preceding the 2010 floods in Pakistan (Chapter 2).

Each of the four analytical chapters (Chapters 3 – 6) is intended to stand on its own, as a coherent, complete and cogent work of research that addresses a specific gap in the literature, and then goes on to employ empirical analysis to establish causal relationships. The structure of each chapter is intended to lend itself to eventual publication as a paper in academic journals. Each chapter has a distinct analytical focus, empirical approach to causal identification, conceptualisation of the mechanisms underlying the causal relationships, and theoretical and policy implications. However, the chapters also work together to provide a more complete understanding of intersecting, simultaneous and sometimes complementary causal mechanisms that link extraneous and pre-flood economic, political and social factors, and post-flood household behaviour.

The four chapters have much in common: they are centred on the empirical analysis of household behaviour in the year following the 2010 floods in Pakistan. They make use of a common household survey dataset, the baseline household survey for the Government of Pakistan's Citizen's Damage Compensation Programme – Phase II transfers which was conducted between December 2011 – February 2012, and that is

[1] Economists v/s Economics. Blog post for Project Syndicate. Published and Accessed online at https://www.project-syndicate.org/commentary/economists-versus-economics-by-dani-rodrik-2015-09#jp3xcglCZio2jOrQ.99 on 10 September, 2015

representative of all flood-affected areas in Pakistan's four main provinces (OPM, 2013).[2] Before describing each of these analytical chapters in some detail, I first provide a brief background to the economic, political and historical features of Pakistan following the 2010 floods that are germane to the subsequent analysis.

1.3 Understanding the Context: Pakistan Before and During the 2010 Floods

Geography: Pakistan is home to nearly 180 million people and is the sixth most populous country in the world. Covering an area of just under 800,000 square Kilometres, the country is divided into four provinces (Punjab, Sindh, Balochistan and Khyber-Pakhtunkhwa – formerly known as the North-West Frontier Province) and four federal territories (Islamabad Capital Territory, Gilgit-Baltistan, the Federally Administered Tribal Areas – FATA, and the disputed Azad Jammu and Kashmir). There are three tiers of sub-provincial local government: the district, the *Tehsil* (sub-district), and the Union Council. Over 62% of the population lives in rural areas, and about 45% of the labour force are engaged in agriculture. The population is diverse along ethnic and linguistic lines, with at least 27 distinct ethnic groups and several languages and dialects.

Fig. 1 Political Map of Pakistan

[2] Described in further detail in Chapters 3 – 6

Source: World Trade Press Inc. at
http://www.bestcountryreports.com/Political_Map_Pakistan_Provinces.php

Demography and Economy: Pakistan is a young country with 68% of the population below the age of 30 and the median age of the population being 22. Poverty remains a key challenge for the country; while the share of population below the official poverty was 13.6% in 2011, the share of population just above the poverty line and vulnerable to poverty was as high as 60%, indicating a large population clustered around the poverty line, as well as a considerable rich-poor gap (World Bank, 2014). In Pakistan, although poverty reduction has been found to be strongly correlated with growth, progress on the Millennium Development Goals and the Human Development Index remains low, particularly on gender, health, nutrition and population indices (ibid.). Economic activity is dominated by agriculture as industrial activity and growth have been heavily constrained by emerging as well as structural problems including power shortages and low productivity.

Political Structure and History:[3] For much of its history since its creation following the partition of India and independence from British rule in 1947, Pakistan has alternated between democracy and military dictatorship. The most recent period of military dictatorship that began with General Parvez Musharraf's coup d'état in October 1999 ended in 2008, following the assassination of the former Prime Minister Benazir Bhutto, and the victory of the Pakistan People's Party that she led until her death in December 2007. With her widower, Asif Ali Zardari assuming office of the President of Pakistan and a multi-party consensus in parliament, the newly elected democratic government passed the historic 18th Amendment to the Constitution of Pakistan which fortified the powers of elected governments and parliament, and devolved greater fiscal and legislative powers to provincial governments under Pakistan's federal structure (NAP, 2010).

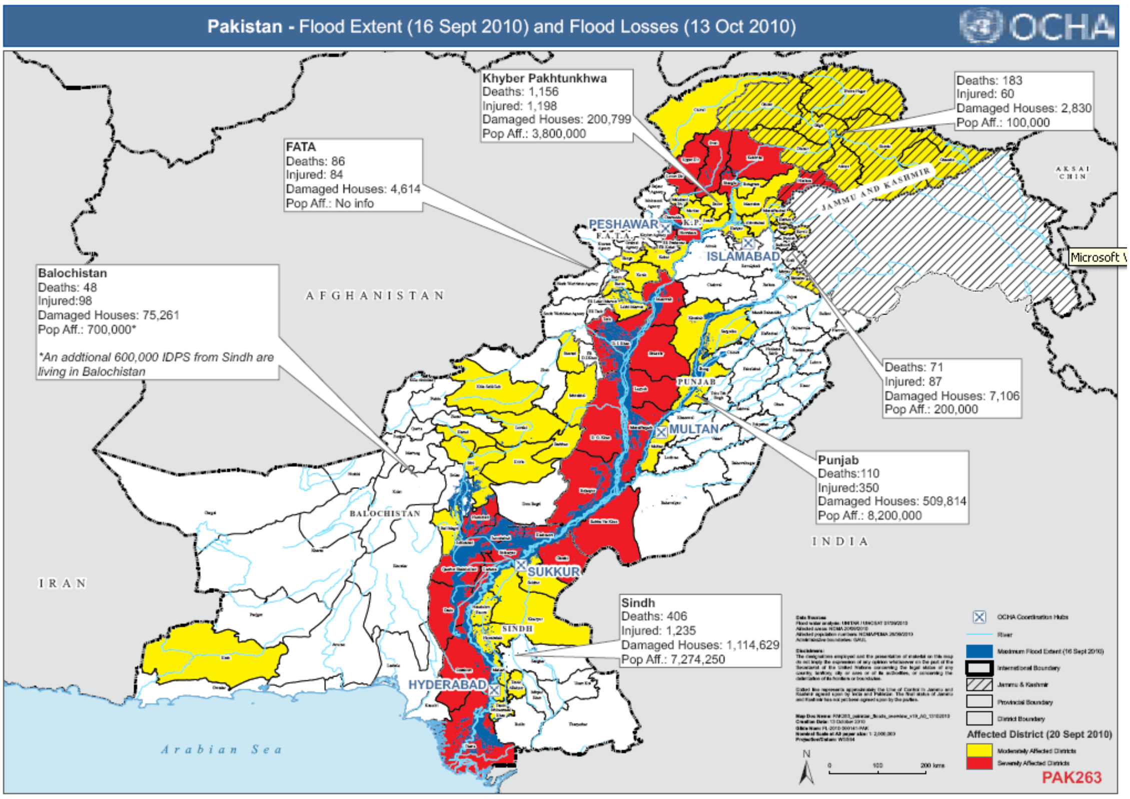
The transition to democratic rule under a new government also brought renewed attention to Pakistan's social protection landscape. The government, supported

[3] Conflict is a critical part of Pakistan's recent political history and is described in much detail in Chapter 2

technically and financially by donors including the World Bank launched the country's first ever nationwide cash transfer-based safety net programme: the Benazir Income Support Programme (BISP) to provide cash transfers to women recipients in the poorest households. Targeting was based on a Proxy-Means Tested poverty scorecard developed by the World Bank, another first for the country which had previously relied on discretionary quotas of elected representatives for beneficiary selection. When the 2010 floods hit Pakistan, the government responded by launching a cash-transfer based flood relief programme, the Citizen's Damage Compensation Programme, also the first time that cash transfers were used to provide flood relief in Pakistan.

The 2010 Floods: Pakistan experienced its most severe flooding in recorded history in 2010-11 which started during the monsoon season in July-August 2010. This was caused by exceptionally heavy rainfall, which inundated much of the Indus river basin, and also led to severe flash flooding in many areas not directly linked with major river systems. The volume of rainfall in Pakistan as a whole was 87% above normal in the year 2010. The meteorological causes for this exceptionally high rainfall is a subject of some debate, and scientists assessments attribute it to La Nina on the one hand (NASA 2010), and the freezing of jet streams on the other (Marshall, 2010; Houze *et al.*, 2011). The official death toll due to the floods was about 2,000. However, according to Government of Pakistan estimates, about 20 million people were affected by the floods through displacement and damages to land, property and livestock. In addition to the displacement of entire populations, there was large scale destruction of at least 69,000 square KMs of fertile agricultural land, an estimated loss of 200,000 units of livestock, losses to power generators and transmission systems that caused shortages of about 3.153 GW of power, as well as the outbreak of several diseases such as malaria, gastroenteritis, cholera and diarrhoea.

Fig. 2 Flood Affected Districts in Pakistan – 2010



Source: UN Office for the Coordination of Humanitarian Affairs. Available at http://www.publications.parliament.uk/pa/cm201012/cmselect/cmintdev/615/61504.htm and accessed on 21 September, 2015.

1.4 Thesis Organisation: Research Questions and Chapter Outlines

I now describe each of the constituent chapters of my thesis, highlighting the academic and wider motivation for the chapter, the empirical approach adopted and the main results of analysis.

Chapter 2: Mapping the Spatial and Temporal Variation in Violent Conflict in Pakistan 2001-10: Results from the South Asia Terrorism Portal Conflict Event Timeline

How did Violent Conflict vary spatially and over time in the decade preceding the 2010 floods in Pakistan?

Observing and identifying the micro-level variation in exposure to conflict is critical for understanding its local effects. Doing so, however, is often hampered by the lack of credible, systematic and consistent granular data that covers a long period of time. Chapter 2 of my thesis is a descriptive account of violent conflict in Pakistan over the decade of the 2000s. I begin with an analysis of the historical and political origins of violent conflict in Pakistan. I describe the main militant groups operating in Pakistan over 2001-10, and sketch the evolution of the Pakistani state and military's attitude towards the militants, and thus also the contours of political contestation. I use the South Asia Terrorism Portal (SATP) conflict events timeline for Pakistan to develop district and tehsil-level indices of conflict, and describe the process of data entry, tabulation and analysis.

My analysis of the SATP data shows a dramatic increase in killings due to violent conflict over the 2001 – 10 period, particularly pronounced in the post-2007 phase. I find considerable spatial heterogeneities in the exposure to violence over this period as high conflict provinces contain districts and *tehsils* that are relatively very peaceful, further strengthening the case for disaggregated and micro-level analyses of the effects of conflict. I also find evidence for the improved capacity of security forces and their more vigorous pursuit of militant targets starting 2007.

A vast literature has examined the direct effects of conflict on household welfare and human capital (Justino, 2011; Justino *et al.* 2013; Akresh and de Walque, 2008; Ibanez and Moya, 2006; Alderman *et al.*, 2006). I therefore focus attention to the comparatively under-studied indirect effects. The covariance of suffering at the community level in the aftermath of a natural disasters in which most households are hit, to at least some extent, compromises the efficacy of intra-community support. It also makes outside help, through public and private channels, critical to household well-being. I therefore focus on how conflict affected households' access to cash transfer programmes (as examples of public transfers) and remittances (a form of private transfers) in the aftermath of the 2010 floods in Pakistan, in Chapters 3 and 4, respectively.

Chapter 3: Calamity, Conflict and Cash Transfers: How Violent Conflict Affects Access to Aid in Pakistan

How does conflict affect household access to cash transfer programmes, and what mechanisms explain such effects?

There is a growing interest among the international donor community, and governments to devote more aid to conflict affected and fragile states/ areas. In much of the literature examining the relationship between aid and conflict, variables indicating the receipt of aid are typically on the right hand side of an estimation equation, as they are framed as causal factors of the intended political or economic outcome on the right hand side. (Justino, 2011; Crost and Johnston, 2014; Beath *et al.*, 2009; Khanna and Zimmerman, 2014). But does the existence of conflict not affect the provision of aid in the first place?

I use the community-level distance to the Afghanistan-Pakistan border – a correlate of Taliban strongholds, areas of regrouping and militant operation in Pakistan following the War on Terror in Afghanistan, as an Instrumental Variable for exposure to violent conflict, and control for a wide range of potential confounders to identify the causal effect of conflict on household access to cash transfers. I find that a 10% increase in the number of people killed in the tehsil (sub-district) over 2001-10 reduces household access to two large government-run aid programmes – the Citizens Damage Compensation Programme (CDCP)[4] and the Benazir Income Support Programme (BISP)[5] by 5.2% and 4.4%, respectively.

I also exploit the Taliban's avowed opposition to girls' schooling and their ability to reduce female primary enrolment in areas of their presence to identify areas likely to be under Taliban influence – not always the same as areas where violent contestation may occur (Kalyvas, 2006). I examine residuals from the community-level estimation of female primary enrolment rates after including a wide range of supply and demand side

---

[4] A one-time lumpsum flood relief cash grant
[5] An unconditional monthly/ quarterly cash transfer programme for women recipients in poor households

determinants of girls school enrolment in order to isolate the effect of the influence of the Taliban – otherwise an omitted variable. Using such residuals to mark out areas with more/ less likely Taliban presence, I find that the presence of the Taliban and its affiliate groups drives the negative effect of conflict on aid access. The ability of the state to use cash transfers to provide economic support, regain legitimacy and establish writ is therefore subject to the extent to which the cash transfer programmes are not blocked by militant groups. This is particularly valuable to Pakistan as several policy pronouncements indicate that the Government of Pakistan views social protection programmes, and cash transfers in particular, as tools of nation building and means to re-establish legitimacy in conflict-affected areas.

Chapter 4. Informal Finance, Investment and Insecurity: How Violent Conflict Affects Access to Remittances in Pakistan

How does exposure to conflict affect household access to private remittances, and what mechanisms explain such causal effects?

In Chapter 4 I examine how conflict may affect households' receipt of private transfers in the form of remittances, by altering the incentives for remittances, or by affecting the modes through which remittances are paid.

The literature on the links between conflict and remittances, consisting mostly of country-level case studies, finds that remittances tend to increase in response to conflict as the latter evokes altruism among remitters abroad who send money to family and relatives back home to cope with the hardships and (economic) losses caused by conflict. It does not, however, sufficiently engage with the microeconomic effects of conflict on the motives for sending and receiving remittances. Specifically, while studies have shown that remittances arise from both altruistic and investment purposes, the country-level studies tend to focus on how conflict affects altruism-driven remittances, but not on how conflict may affect the signal on returns to investments and therefore investment-focused remittances. Further, the country-level studies ignore sub-national and micro-level variation in exposure to conflict, focus only on international remittances and take a relatively shorter-term assessment of conflict exposure (over 1-2 years). The subject of remittance responses to conflict has not yet been critically studied in a microeconomic framework, with due attention to the channels through which conflict may potentially impede private remittance flows.

I examine the causal effects of long-term exposure to conflict, measured at the micro level, on the receipt of remittances by households affected by 2010 floods in Pakistan over a year following their onset. Using IV estimation to overcome the endogeneity of conflict exposure and remittance receipts, as employed in Chapter 3, and controlling for a range of confounding factors, I find that, contrary to the literature from country-level case studies, long-term exposure to conflict reduces the likelihood of households receiving remittances, as well as the amount of remittances. I find that an increase in the number of killings due to conflict at the *tehsil* level over 2001 – 2010 by 10% would cause a reduction in the likelihood of a household receiving any remittances by about 4% and a reduction in the amount of remittances received by about PKR 2,835 (US$ 33) over the period of one year. The likely presence of Taliban-affiliate armed groups, estimated in Chapter 3, which is associated with the lower security of financial transactions, particularly when money moves through informal channels, reduces remittance receipts at the household level. The remittance receipts of households that have formal bank accounts are, however, insulated from the effects of conflict. I also find that the negative effect of conflict on remittances is stronger for groups that are more likely to use such receipts to invest, rather than for consumption. This highlights how conflict operates on the investment motive to reduce household-level receipts of remittances.

Chapter 5. Unintended Consequences of Aid? Conflict, Cash Transfers and Gun Ownership in Pakistan

Can disaster relief cash transfers lead to household acquisition of guns? If so among which groups, and under what circumstances?

Chapter 5 of my thesis examines how aid could, somewhat unintentionally, create the conditions for future violence. In recent years, this causal link has been of much interest in the political science literature as scholars have examined whether aid can quell or fan future violence. The chief mechanisms through which aid has been found to have any significant effect on violence include the facilitation of intelligence sharing (Berman et al., 2011; Khanna and Zimmerman, 2014), sabotage by rebel groups (Crost and Johnston, 2014), and the redress of grievances (Justino, 2011). However, no studies have examined whether aid may result in civilian militarization, a factor that can potentially increase violence in the future.

For certain groups that have lower material vulnerabilities (the rich and wealthy, or those who have not suffered much in the floods), but who face high security threats (in conflict affected areas, for example), the immediate security needs may be greater than material ones. In such a situation, the exogenous injection of (fungible) cash, through flood relief, can be used to acquire guns to fulfil a security need. This possibility has not been examined in any empirical setting thus far.

I examine the effect of the CDCP – Phase I transfers on gun purchases in the aftermath of the floods in Pakistan in 2010. Using covariate balanced propensity score matching to overcome selection bias in treatment assignment, I find that for the population as a whole, the cash transfers did not have any significant effect on the likelihood of buying guns. However, for households with 1.5 acres or more of land (the rural elite) and residing in conflict-affected areas, the transfer increased the likelihood of acquiring a gun by 8.3%. This effect is driven by the wealthy households that suffered displacement and had to live in flood relief camps – often marked by criminal acts including extortion, theft, robbery and assault. Such households that have low material but high security needs may have found it optimal to use cash transfer receipts to bolster their sense of security by acquiring guns.

Chapter 6: The Effect of Disaster Uncertainty on post-Disaster Coping: How Flooding Anomaly affects the propensity to Migrate

Does the extent of flooding uncertainty – measured as the degree to which floods in 2010 were anomalous compared to the past – affect household and individual migration?

The microeconomic literature on natural disaster impacts has focused, in large part on the risk of disaster exposure and on how households respond to such risks, by adopting a number of risk coping strategies. However, a related but distinct concept in economic theory – uncertainty (first discussed in Knight, 1921), and its effect on coping strategies remains under-studied. Risk pertains to factors whose probabilities are known, or can be estimated (known unknowns – according to Dercon, 2003); whereas uncertainty refers to 'unknown unknowns', i.e. factors for which households do not know the probability of occurrence.

I examine the role of uncertainty in determining migration decisions by relating a greater degree of uncertainty of flooding with more anomalous episodes of flooding. In other words, the less anomalous the episode of flooding in an area was in 2010, compared to past years, the lower is the degree of uncertainty of flooding shocks. I develop a proxy measure of the extent of flooding anomaly, compared to likely past exposure to flooding, based on satellite data on community-level daily precipitation levels for the last 30 years, as well as community distances to the nearest river. I find that while flooding exposure increases the propensity to migrate (in line with the global literature, comprehensively surveyed by Belasen and Polachek, 2013, and Drabo and Mbaye, 2011), more anomalous flooding (a proxy measure for the realisation of a more uncertain shock) in fact lowers this propensity. This is possibly because households and individuals less exposed to floods in the past may lack the social connections, mental preparedness or the wherewithal required to migrate when they are hit by a flood. On the other hand, more regular flooding exposure may have equipped households with the material, social and psychological resources required to migrate after the floods in 2010.

1.5 Connecting the dots: What does this thesis reveal about household behaviour in the aftermath of the 2010 floods in Pakistan?

The analysis presented in this thesis seeks to contribute meaningfully to deepen the understanding of microeconomic dynamics that play out in complex emergencies, particularly in the context of the 2010 floods in Pakistan, which covered large parts of the country, including areas that had been exposed to varying degrees of violent conflict prior to the onset of the floods. While each chapter of this thesis has a specific focus, to allow in-depth analysis, a synthesis of the findings from all the chapters helps paint a more complete picture of the effect of the 2010 floods on households in Pakistan. I recap the contributions of each chapter individually, and then identify the contributions and themes that emerge across chapters.

At the time of commencing this thesis (and until now), there was no singular and ready resource available to provide both contextual and empirical background to the spatial and time variation in violent conflict in the period immediately preceding the 2010 floods. Chapter 2 makes two prominent contributions. First, it assimilates narrative and empirical accounts of contemporary and recent historical causes and patterns of political violence in Pakistan, consulting sources across history, security studies, political science and international relations disciplines, as well as presenting results from descriptive statistical analysis. Secondly, it presents results analysis from the first-ever compilation of sub-national and motivationally-disaggregated data on conflict events in Pakistan using the South Asia Terrorism Portal conflict events timeline for the period 2001-10.

The findings of Chapter 3 compel researchers to appreciate the two-way character of the aid-conflict relationship, and caution policymakers on the limitations and challenges of aid in conflict-affected settings. I also contribute to the economic analysis of conflict by devising and applying a unique empirical method that attempts to identify areas with the presence and control of the Taliban and affiliate militant groups in Pakistan – distinct from areas which they attack, which is a big challenge across many politically contested spaces globally.

Chapter 4 contributes to the knowledge of the relationship between conflict and remittances by bringing a micro-perspective to a field that is so far dominated by country-level analysis. By highlighting the security link between conflict and remittances – in terms of the possible threats and dangers faced by informal money transfer agents by Taliban-affiliate armed groups, as well as the negative signal that long-term conflict exposure sends to investment-focused remitters, I outline the mechanisms due to which the broad findings from country-level analysis may not hold at the micro level. The findings also seek to temper expectations that remittances from outside can be leveraged to support growth and development in conflict-affected settings, by bypassing on-ground security concerns.

Chapter 5 examines and finds evidence for an important but hitherto ignored mechanism through which aid may lead to violence in the future – civilian militarisation through the purchase of guns. This has important implications for policy – making a case for the tighter targeting of cash transfers, particularly in conflict-affected areas to deter gun purchases, but also drawing attention to the need for the government to provide better security in flood relief camps, failing which, at least the materially better off households may divert aid money to the provision of private security. The chapter also identifies the household and community-level correlates of gun ownership in Pakistan, providing multivariate quantitative analysis of a subject of much importance to local politics, criminology, and sociology in Pakistan, but which has thus far only been commented upon anecdotally and non-systematically

In addition to making an empirical contribution in terms of developing a proxy measure for the extent of flooding anomaly – as an indicator of uncertainty – and demonstrating its causal effect on the propensity to migrate, Chapter 6 highlights the need for researchers and policymakers to consider how (the lack of) shock recurrence can affect the ability and form of coping. It emphasises the need to consider not just the extent of shock severity, but also the degree of shock anomaly as a strong predictor of post-shock choices. Households and individuals who were less likely to have encountered flooding before 2010, and therefore had not invested in the material and non-material resources to migrate in response to floods were not as mobile as those who faced flooding more recurrently in past years. Therefore, when groups are affected by a shock whose expectation is unknown, they may become more isolated *in situ*. Such an outcome, caused by the realisation of an uncertainty, could have potentially lasting consequences for human survival and development, and is therefore relevant also to the policy implications of development microeconomics research.

Some contributions and common themes also emerge from the findings across chapters.

First, across all analytical chapters, I find that the relationship between flooding exposure and household behavior is not always direct but is mediated by several factors – both within and beyond the control of the household in question. The attitude and capacity of state institutions that determine actions and public interface, the prevailing political and security situation, the motivations and actions of rebel groups, the historic trajectories of flooding exposure, the nature of the informal economy and reliance on customary social institutions, all determine how flooding shocks affect households. Equally, households' and individuals' own characteristics, including, and not limited to, wealth and land ownership, ethno-linguistic identity, demographic make-up, access to migration and remittance networks, and gender, were shown to be critical for determining how they fared in the year after the floods. This thesis highlights the sources of variation of the household-level effects of natural disasters and conflict.

Secondly, I find that micro-level variations in pre-flood characteristics are critical to post-flood outcomes. Chapter 6 shows that the extent and type of exposure to flooding itself varies considerably, between as well as within communities. Chapter 6 also highlights how community-level variations in the likely past exposure to floods determined the propensity to migrate. Chapter 2 shows that violent conflict, which often characterizes Pakistan as a whole, in media and other narratives, varies considerably at the sub-national – including district and *tehsil* levels. Subsequently, Chapters 3 and 4 exploit the micro-level variation in exposure to conflict and show it to reduce household access to both public and private transfers. Finally, Chapter 5 shows that even the household-level effects of flood relief cash transfers on (in this case) the propensity to purchase guns, vary across household and community characteristics – high land ownership and conflict exposure, respectively. In this research I attempt to exploit micro-level variations in social, political and economic steady states to explain their differential effect on households in the aftermath of flooding shock. The salience of the variation in local-level economic, social and political features determining household behavior in response to shocks is prominent across Chapters 3 – 6, re-emphasizing the importance of microeconomic analysis.

This thesis also finds that the extent of flooding anomaly (treated in Chapter 6 as an indicator of the uncertainty of shocks) is a crucial determinant of household choices and welfare. The likely past exposure to shocks is a determinant of households' and individuals' propensity to migrate (explored in Chapter 6), and is also possibly a factor that signals the need for altruistic support from outside – remittance receipts are significantly and positively associated with more anomalous episodes of flooding, and have no significant relationship with the extent of flood exposure per se (an additional finding in Chapter 4). This thesis makes a case for according greater importance to the historical experience of shock exposure as a factor that determines post-shock responses.

Among thematic findings, Chapters 3 and 4 highlight that security concerns are rather intractable, and that they limit the reach of both public and private transfers in conflict-affected settings. Neither public transfers, in the form of cash transfer programmes, nor private remittances are solutions that can be parachuted into conflict-affected areas to provide a modicum of support to households, bypassing security threats from rebel groups. The chapters highlight the increasing financial isolation of households, from both public and private sources, as a consequence of long-term exposure to violence and of rebel control. This is particularly worrisome in the context of a covariate shock which places limits on intra-community insurance mechanisms, and invokes a greater need for outside help, through transfers. Such isolation resulting from conflict, if continued over a long period of time could lead to local economic stagnation and the further impoverishment of households and communities.

Importantly, the findings of this research compel a careful examination of the potential and the limitations of aid programmes in conflict-affected settings. The security risks associated with violent conflict and rebel control limit the household-level coverage of two large cash transfer programmes, questioning therefore the efficacy of the state using aid as a means to counter the effects of conflict and win populations over. Furthermore, as Chapter 5 shows, it is possible for aid programmes to unintentionally contribute to processes of violence. Far from conclusively quelling grievance and strife, aid programmes may unwittingly lead to the escalation of violence at least at the local level via civilian militarization (the purchase of guns).

Aid programmes are not a silver bullet that can overcome the institutional frailties associated with conflict. They must be carefully designed and targeted to overcome potential threats of under-coverage, exclusion and misuse. The findings also suggest that the wider development objectives of aid programmes can only be realized with sufficient and effective attention to improving the security climate. This requires wide-ranging political interventions requiring strategic and operational convergence among national and local administrative, police, military and welfare state institutions, and for the international development and donor community to be cognizant of the need for such convergence.

To summarize, this thesis draws attention to salient relationships that researchers, governments, and aid agencies must be more cognizant of while working in a complex emergency setting, of which the 2010 floods in Pakistan, spanning conflict-affected and peaceful areas is a prime example. At the intersection of such vulnerabilities, governance must additionally respond to a multiplicity of challenges – the isolation of communities from transfers, rebel group presence and security threat, the uncertainty embodied in anomalous shocks that limits households' and communities' adaptive capacities, and the potential misuse of aid. The thesis concludes with a stronger reiteration of its motivation at inception: the need to engage with the intersection, rather than the singularities of vulnerability that large numbers of people across the world, illustratively in Pakistan, continue to face.

Chapter 2. Sub-national Conflict in Pakistan 2001-10: Overview and Empirical Insights from the South Asia Terrorism Portal

2.1 Introduction

This chapter provides an overview of violent conflict in Pakistan between 2001-10, examining the nature and historical development of violence in the country, and focusing on sub-national patterns and trends of violence using data from the South Asia Terrorism Portal. Right from its creation in 1947 and through decades alternating between military rule and democracy, Pakistan has witnessed various forms of conflict, external and civil alike. The period following the 9/11 attacks and the US-led War on Terror, however, has been the bloodiest and most enduring spell of strife. Violence is widespread; from districts and villages bordering Afghanistan, and the metros of Karachi, Lahore and Islamabad, to the vast restive province of Balochistan. It strikes luxury hotels as well as cattle fairs, churches as much as cinemas; high profile politicians in the heart of cities as also tribal communities in mountainous villages.

A commonplace association of high intensity violence with Pakistan as a whole nation glosses over the multiple dimensions and motivations of conflict, and its disaggregated concentration across the country. An analysis of only national and aggregate trends of violence in Pakistan is especially limiting to a deeper engagement of its relationship with microeconomic outcomes. While the scale of violent activity has been high in the country as a whole, there also exist conspicuous islands of calm and insulation among areas that have witnessed very high levels of violence. These differences are bound to alter the course of economic development, social order, household behaviour and individual action at the local level, and are therefore critical to both academic understanding of the economics of conflict, and to policy institutions working in Pakistan. Yet, the topic of the micro-level exposure of the various forms of violent conflict, and how these are changing over time in Pakistan remains under-researched. It is to this critical gap that this chapter addresses itself.

The remainder of this chapter is organised as follows: Section 2 provides a background to the various forms of conflict in Pakistan and outlines its manifestations. Section 3 assesses the main sources of publicly available data on conflict incidence and location in Pakistan, discussing their relative strengths and limitations, and the concerns pertinent to comparability across sources. Section 4 presents the methodology employed in the author's original exercise to tabulate conflict event data from the South Asia Terrorism Portal. Section 5 presents key descriptive results on the spatial and time trends of violent conflict in Pakistan over 2001-10. In addition to summarising the key findings, section 6 concludes.

2.2 Violent Conflict in Pakistan: Historical Development and Contemporary Manifestations

2.2.1 Historical Context and Development

Pakistan has witnessed high levels of conflict at several junctures during its volatile history. Its creation in 1947, resulting from the partition of India, was accompanied by the large-scale migration of communities, and also communal rioting, killing and other violence. The partition itself was born out of heightened misgivings over the security and status of Muslims in a Hindu-majority India, setting the stage for strong Islamic overtones to alter the course of Pakistan's institutional development,[6] over the decades to come.

From the onset of independence, Pakistan was faced with its most compelling and enduring territorial dispute with its larger neighbour India; over the state of Jammu and Kashmir. The dispute remains unresolved to date and has been a continuing cause for regional militarization. This has manifested in, among countless skirmishes and tense border deployments, three wars between the two countries. The legacy of these conflicts includes the securitized focus of regional and international relations. Furthermore, it has placed emphasis on building and maintaining a large security apparatus to ward off any threats, both real and perceived. Bokhari (2011) argues that the experience of partition

[6] Even though the founding leaders of the country, particularly Mohammad Ali Jinnah were committed to a secular state

heavily influenced the conceptualization of the state; emphasizing Islam and eventually allowing the Army to operationalize "*jihad*" to motivate war against India.

Over decades, the Pakistani state has struggled to find the rightful place of Islam in national life; whether it should be a cultural unifier or source of theocratic order, a matter of citizen's private faith or the primary marker of the state, a monolith with a strict interpretation or one that incorporates multiple traditions in its fold. The sufficiency of Islam in defining a national identity has been challenged, most visibly during the 1971 India-Pakistan war which led to the creation of Bangladesh. Islam by itself had proven unable to forge a national character, one that would override the cleavages of ethno-linguistic identity. As tensions between East Pakistan (Bangladesh) and West (present-day) Pakistan grew, India intervened militarily in support of Bangladeshi freedom fighters. The victory of Indian forces led to the independence of Bangladesh. The Indian intervention in Bangladesh, however, only increased Pakistan's focus on the threat of external aggression, at the cost of emerging domestic cleavages. This implied a relative inability to tackle home-grown and civil war situations viz. confrontations on the border (Jones and Fair, 2010).

Pakistan's alternating trysts with fledgling democracy and military dictatorship since its creation further entrenched an external security focus, one that subsequent democratic administrations have struggled to fully shake off. The period of Zia-ul-Haq's military dictatorship in the 1980s coincided with the Soviet Occupation of Afghanistan. This development in the peak of the Cold War perplexed and agitated the US, which responded by seeking to arm rebel fighters of the Afghan *Mujahideen* (including Osama bin Laden), through active support and involvement of Pakistan. Zia-ul-Haq's military regime in neighbouring Pakistan found this a timely and favourable lease of life to simultaneously obtain international legitimacy, negotiate aid and financial support for both military and civilian purposes, as well as extend influence over Afghanistan and ingratiate itself with the US as a means of achieving "strategic depth" in the region to thwart any attempts by India at military adventurism (Jones and Fair, 2010; Gul, 2010). Within Pakistan, Zia-ul-Haq undertook policies that curtailed individual freedoms, suppressed dissent and encouraged the influence of Islamist groups on matters of jurisprudence, education and public religiosity. By pandering to such groups Zia-ul-Haq achieved their allegiance to bolster the legitimacy of his reign, and also attempted to forge an Islamist national identity. These calibrations effected a definite turn in Pakistan's political trajectory towards a distinct iteration of an Islamic state and fortified the entrenchment of religious groups and their ideology in the establishment. The war in Afghanistan also put strain on Pakistan's economy as the country hosted over 3 million Afghan refugees and also saw the proliferation of the illegal arms and narcotic drugs economy (Gunaratna and Iqbal, 2011). Subsequent democratic governments in the 1990s (often short-lived due to political manipulations of the security establishment) were unable to fully undo the influence of extremist and security-centric paradigms, and often found their authority circumscribed by the military. Indeed, they also felt the need to demonstrate their own commitment to the priorities of strategic depth and the support for some degree of the Islamic character of the state in order not to fully antagonize the recently overthrown and covertly powerful military. This extended to supporting the establishment's designs to install the Taliban government in Afghanistan in the 1990s and to supporting certain *jihadi* groups (Fair, 2011). The strategy was driven by Pakistan's strong desire to install a pro-Pakistan regime in Kabul, despite the Taliban's promotion of terrorism and the growth of arms and ammunition which was a direct fallout of the anti-Soviet War in Afghanistan during the 1980s.

All along, the persisting intractability of the Kashmir dispute, despite diplomatic engagement on the one hand, and outright war on other occasions, led Pakistan to encourage and support Kashmiri separatists, through both open and covert means, including the incubation of militant training camps on Pakistani soil. Pakistan's status as a nuclear power, pursued and achieved determinedly in the 1970s, emboldened it to pursue such "asymmetric warfare" as it was confident of no major military retaliation (Jones and Fair, 2010; Rashid, 2012). The patronisation of non-state armed actors to further foreign policy objectives, in the case of Kashmiri militants, as well as the *Mujahideen* (religious fighters – who would go on to become the Taliban) to fight the Soviet occupation of Afghanistan in the 1980s, along with the growing strength and influence of Islamists at home would set the stage for Pakistan's most enduring and deadly confrontation within. The concatenation of certain political events, both local and global, would soon be reflected in the Pakistani state's greatest battle to assert its writ, in response to the actions of groups that it once spawned.

2.2.2 Multiple dimensions of violent conflict in Pakistan

While the focus of contemporary analyses of conflict, both academic and otherwise, in Pakistan tends to be on militant and terrorist violence (justifiably, given its scale and death toll, as will be shown later on in this chapter), it is important to bear that there have been several motivations and forms of political violence in Pakistan over the last many decades.

Among the most enduring intra-state conflicts in Pakistan is the prolonged insurgency in the vast and restive province of Balochistan. Led initially by traditional tribal leaders (*sardars*), the movement is increasingly represented by the middle class (Grare, 2013). In the 1970s the insurgency was sought to be crushed by the use of brute force by the Army under the democratically elected Prime Minister Zulfikar Ali Bhutto. More recently, the years under the dictatorship of General Musharraf in the 2000s saw the tactics change to targeted killings and forced "disappearances" of key leaders and insurgents, many of whom now emerged from educated middle-class backgrounds. The economic, political and cultural subjugation of the Baloch people within the Pakistani mainstream, particularly the unfairness in the appropriation of mineral and other resources by the non-Baloch is critical in fuelling the sense of alienation, and in garnering support for the insurgency. Many Baloch separatist/ insurgent groups adopt violent means of protest and agitation, which forms part of a cycle of violence between the Pakistani state/ military and several Baloch nationalist groups.

Sectarian violence has been a growing phenomenon in Pakistan. In the 1980s, following the Iranian Revolution, sectarian violence was conflated with a peasant-led class struggle as groups such as the (now banned) Sipah-e-Sahba that mobilized the vast Sunni Muslim peasantry to revolt against the few but wealthy Shi'a landlords. The encouragement of radical Sunni Muslim groups by Zia ul Haq (Jones and Fair, 2010; Zaman, 1998) led to a deepening of the sectarian conflict as Shi'a groups began to retaliate violently. In recent years targeted attacks on Shi'as have intensified, particularly in larger cities including Karachi, Quetta and Lahore.

Another important group that is often subject to identity-based violence is the Ahmadiya community. While the community consider themselves Muslims, they were officially deemed to be non-Muslim by Prime Minister Bhutto's government in the 1970s, owing to certain beliefs that are deemed to be antithetical to Islam by many Shi'a and Sunni groups. Recent years have also witnessed an escalation in violence against religious minorities including Christians and Hindus, in forms such as targeted killings, abductions and allegations of acts of blasphemy.[7]

The bustling urban centre of Karachi, Pakistan's largest and most cosmopolitan city has had steady and sustained exposure to violence since the 1980s. Starting with a phase of high antagonism between the Urdu-speaking *Mohajir* community that had migrated from India and Sindhi, Punjabi and Pashtun ethnic groups (among several others), the city also bore the brunt of inter-gang violence over the control of resources in the sprawling metropolis, as well as the stranglehold of a land mafia. In more recent years the vast influx of the Pashtun population from Afghanistan, border areas in the FATA and several districts of KPK in the North-West, owing to violence and insecurity in and near Afghanistan has further complicated the ethnic make-up of the city and has posed several challenges to the ability of the state to assert control and check the regrouping of violent elements. More generally, Nawaz (2011) draws attention to Pakistan's burgeoning cities where crime and bad governance are likely to be very serious challenges in the years to come.

2.2.3 9/11, "War on Terror" and their violent fallout in Pakistan

The post-9/11 period in Pakistan has witnessed a spurt in militant violence, spreading from Afghanistan to well within the geographical boundaries of Pakistan. Yusuf (2014) divides this time period into two distinct phases: 2002 – 2007, and post-2007. This distinction is made on the basis of a sharp difference in the scale and degree of permeation of violence in the country, the attitude of the Pakistani state and the resultant

[7] Which has become a very controversial and sensitive subject in recent years

strategy for fighting militants before and after 2007. Below, I discuss the main features of the form and trajectory of militant violence and the state's response over these two time periods.

2.2.3.1 Phase I: 2002 – 2007

The 9/11 terror attacks on the US and the ensuing "War on Terror" to dismantle the terrorist architecture of the Al Qaeda, centred in Afghanistan had a direct and lasting impact on Pakistan. First, Pakistan's (then) newly installed military dictatorship under General Musharraf leveraged the country's geo-strategic advantage to further US military interests in the region by allying with the US-led War. In doing so, it abandoned the Taliban regime and allowed the US the use of its air bases and land routes for troop deployment, in exchange for greater military aid and the tacit conferment of legitimacy on the military rule. The fallout of the war in Afghanistan was enormous; Afghan refugees, in the millions, entered Pakistan through the highly porous international border and settled all across the country, from the adjoining and culturally indistinguishable areas of FATA and Khyber Pakhtunkhwa (KPK) to the bustling southern port city of Karachi. This represented a formidable humanitarian crisis at the outset which placed a strain on existing resources and led to overcrowding in particular settlements.

The porousness of the border also facilitated the escape and regrouping of militant elements in Afghanistan in areas such as Waziristan and adjoining agencies in the FATA (Brown and Rassler, 2012; Gunaratna and Iqbal, 2011). Pakistan's support to the US in tackling such groups, particularly the Taliban, viewed by many as a betrayal of the regime in Afghanistan made it a target of attacks itself. Assassination attempts on the President and Chief Executive, General Musharraf were among the first and most audacious attacks on the Pakistani establishment. Their regrouping manifested in acts not only against the symbols of the Pakistani state, but increasingly local populations too, in the form of strict enforcement of Wahabi[8] Islam through what Constable (2011)

[8] A sect of Sunni Islam drawing from the interpretations of Islam offered by Mohammed ibn Abd al-Wahhab of Saudi Arabia in the 1700s, and his adherents. Wahhabism emphasises an ultra-conservative and puritanical practice of Islam.

terms their "reign of terror" - the banning of music, attacks on girls' schools, enforcement of other censures, as well as presiding over an extraction economy. In return locally powerful militant groups such as the Tehrik-e-Nifaz-e-Shariat-e-Muhammadi (TNSM) provided quick and speedy resolution of disputes including the enforcements of punishments in accordance with provisions of Sharia law as well as in keeping with customary tribal law, and also incubated a terrorist economy through poppy cultivation fiefdoms and trade with Afghanistan, often in banned items ranging from opium to illegal weapons and ammunition. As the activity spread well beyond the borders into the Pakistani heartland, insecurity and the tightening grip of extremism were all too palpable even in the hitherto insular and prosperous urban centres.

While the strength and violent activity of many such militant groups increased dramatically after 9/11 and the War on Terror, it is important to note that the political ideology that several of these groups espouse is often much older. These groups draw inspiration from several scholars and political activists including the medieval scholar and theologian Ibn Taymiyyah (1263 – 1328),[9] Jamaludin al-Afghani (1838/9 – 1897),[10] the Egyptian political activist, Sayyid Qutb (1906 – 1966),[11] and the South Asian scholar and Islamist Activist Maulana Abul A'la Mawdudi (1903 – 1979).[12] Jalal (2009) notes that 'Taymiyya, Mawdudi and Qutb are considered the intellectual forbears of "Muslim fundamentalism".' 9/11 and the subsequent War on Terror therefore does not represent the emergence of any new political ideology/ies, rather is a historical event that may well have brought about their strongest and most visible manifestation in Pakistan. Locally, the acceptance for such ideological groups and their vision of an Islamic state among several sections of the population stemmed also from the successive failures of the Pakistani state and society in spheres of criminal justice, law and order, and economic and social justice.

---

[9] who propagated jihad against the (non-Muslim) Mongol invaders of the Mamluk sultanate in present-day Turkey, and a return to Sunni Islam (and whose teachings also had a profound impact on Muhammad ibn Abd al-Wahhab, progenitor of Wahhabi Islam)

[10] Led an anticolonial movement and advocated pan-Islamic unity

[11] He rejected western thought and society and the idea of the secular Western state, and instead advocated for violently fighting Western forces to establish an Islamic state.

[12] Mawdudi stressed the return to Sunni Islam, strict adherence to Sharia and opposed the secular state and western democracy (Nasr, 1996).

In the 2002-07 period, the Pakistan state's strategy towards militancy was a "mix of military action, peace deals, and relative neglect" (Yusuf, 2014). As an ally of the US in the War on Terror, Pakistan went after Al-Qaeda operatives and Arab and Central Asian militants closer to the Afghan border, but not the Afghan Taliban and various Pakistani extremist groups. The belief was that these groups would pose no major threats to mainland Pakistan and could be controlled by the Pakistan Army. The state did not realise the full extent of the penetration of extremist groups within Pakistan, and their ability to function independently, and even against the state (Yusuf, 2011). Where it did act against mostly foreign militants, in the North-West of the country, it often lacked capacity to fight against the gradually coalescing groups. In other instances the state sought peace deals with various militant groups across parts of the FATA. These militants groups used such peace deals to build their own capabilities to challenge and subvert the writ of the state in the future. While the relative levels of violence in this period were lower than in the years to come, the counter-militancy strategy was criticised for failing because of "an approach alternating between excessive force and appeasement" (ICG, 2006).

2.2.3.2 Phase II: post-2007

The gradual emergence of the *Lal Masjid* (Red Mosque) in the heart of the national capital Islamabad as the hub of terrorist activity, including the amassing of weapons, recruitment and indoctrination of fundamentally motivated foot soldiers, and the printing and promotion of literature espousing extremist and violent ideology was an alarming development that severely embarrassed, if not completely threatened, the image of the military regime as able and committed to fighting terrorism. Owing to international, as well as domestic pressure from some quarters, as much as out of an instinct for assertiveness and self-preservation, General Musharraf ordered a military operation against the mosque-cum-seminary in August 2007. The bloody operation left scores killed (including many civilians) and many others captured, and achieved a modicum of sanitization of the premises of the terrorist blot that they had come to embody. Strategically though, the operation proved a disaster as it led to a sympathetic undercurrent for the victims and disdain for the regime that had, after all, ordered an attack on a mosque. Indignation was particularly rife in Chitral and Swat districts where students of the seminary came from.

Aside from demonstrating the regime's ruthlessness and limited options, the move led to the unification of the disparate terrorist outfits under the umbrella of the Tehrik-e-Taliban Pakistan (TTP) against the common enemy, which the US-supported Pakistani government had now come to symbolize. Several of these groups were in control of vast areas in the North West and constituted what Jones and Fair (2010) term an "archipelago of microemirates", loosely united under a type of "Al Qaedaism" where the terrorist outfit provided an inspirational template to motley groups acting in its name (Burke, 2004). The TTP under the leadership of Baitullah Mehsud would go on to confront Pakistan in its bloodiest military campaigns across large swathes of KPK, FATA over which they held sway, as well as cities including Islamabad, Lahore and Peshawar where they launched daring attacks on state and civilian targets alike. Unlike conventional warfare which the Army is used to, this confrontation involved guerrilla fighting in the highlands where the TTP enjoyed a natural advantage. Table 1 below lists the main terrorist groups operating in Pakistan during this time and provides an overview of their objectives, tactics and areas of operation.

Table 1. Major Terrorist Organisations in Pakistan in 2007

Terrorist Group	**Aim/ Objective**	**Main Target**	**Year Created**	**Areas of Operation**
Ansar-ul-Islam	Enforcing Deobandi Islamic code but distinct from LI, sectarian	Lashkar-e-Islam militias	2006	Khyber Agency
Harkat-ul-Jihad-i-Islami (HuJI) (also Harkat-ul-Mujahideen al Almi)	Waging war against all non-Islamic states	Govt. targets in Pakistan, Central Asia; armed forces in India	*Unclear, during Soviet-Afghan War*	Trans-national: Pakistan, Bangladesh, Chechnya, Uzbekistan, Xinjiang China

Jaish-e-Muhammad (JeM)	Liberation of Kashmir from Indian rule, ruin of US/ India	High profile Indian state symbols	2001	Jammu and Kashmir, Indian cities
Jundullah (Army of God)	Opposing US-led War on Terror, targeting non-Muslim occupation of land	Pak Army and government establishments	2002	Karachi, Balochistan, parts of FATA
Lashkar-e-Islam (Mangal Bagh group/ Tanzeem)	Enforcing strict Deobandi Islamic code	Barelvi adherents, landlord class	NA	Khyber Agency
Lashkar-e-Jhangvi (LeJ)	Establishing a Sunni Islamic State in Pakistan	Shi'a leaders and civilians in Pakistan	1996	Across Pakistan
Lashkar-e-Tayyaba (LeT) (renamed Jamaat-ud-Daawa – JuD in 2003)	Liberation of Kashmir from Indian rule	Indian establishments (army and civilian)	1987	Kashmir, major Indian cities (based in Muridke)
Muqami Tehrik-e-Taliban	Resisting NATO/ US troops in Afghanistan, Pak Army if attacked	NATO/ US Forces and Pak Army Allies	2008	North and South Waziristan, border regions in Afghanistan
Sipah-e-Muhammad Pakistan (SMP)	Protecting Shi'as from attacks by Sunni terrorists, retaliatory attacks, Consolidating Shi'a majority areas	Sunni Islamist leaders, clerics and congregations	1993-94	Jhang, eventually across Pakistan
Sunni Tehrik	Attacking Deobandi outfits and establishing Ahl-e-Sunnat order	SSP and LeT cadres, leadership	1990	Karachi, other cities in Sindh
Tanzeem Amar Bil Maarouf Wa Nahi Munkar (Organisation for the Promotion of Virtue and Prevention of Vice)	Implement strict social code based on Salafi Islam	Local populations, NATO troops	2003	Khyber Agency
Tehrik-e-Islami Lashkar-e-Muhammadi (TILM)	Opposing US-led War on Terror, establishing Islamic state	Civilian targets in Pakistani cities	2002	Karachi, Lahore,

Tehrik-e-Nifaz-e-Shariat-e-Muhammadi (TNSM)	Establishing Islamic State based on Wahabi Islam	Local populations, NATO troops	1992	Swat, Malakand

Source: Gunaratna and Iqbal (2011)

The years following the *Lal Masjid* (Red Mosque) operation saw an escalation in terrorist attacks on the one hand, and counter-terrorism/ counter-insurgency by state forces on the other. In particular, the areas of Swat and Malakand in KPK and all the constituent agencies of the FATA region emerged as the battlegrounds of armed struggle, leading to a protracted Internally Displaced Persons (IDP) crisis in many areas. In other areas, particularly in the KPK, that were not as intensely embroiled in the conflagration, the security situation remained uneasy and the influence of terrorist groups, in terms of monopolizing justice and security provision, economic extraction and the articulation and implementation of a fundamentalist diatribe was all too clear. In the larger cities, bomb blasts, suicide bombing, targeted killings, and kidnappings/ abductions became a reality of life leading to perilous effects on social and economic life. Through all the turmoil, a major political change was effected after the National elections in 2008 (the run-up to which saw the assassination of the former and only woman Prime Minister Benazir Bhutto in the last days of 2007, arguably Pakistan's most popular democratic leader at the time) which saw the victory of Bhutto's Pakistan's People's Party led by her widower, Asif Ali Zardari.

The Pakistani government under both the military regime of General Musharraf and after the 2008 elections, the elected Pakistan People's Party government led a long-drawn military campaign against terrorist forces across the country through focused military operations in Swat, Malakand, Bajaur, Kurram and Orakzai areas. North and South Waziristan, followed by their neighbouring semi-autonomous agencies in FATA, posed the greatest danger to the War on Terror as this is where Beitullah Mehsud, the leader of the TTP, was believed to be hiding, and was effectively the headquarters of the TTP. Following the stand-off between the militants and the Army during the Red Mosque operation, it became clear that the groups of militants that had coalesced under the TTP were unwilling to negotiate with the government, leaving little option other than a military confrontation.

The change in attitude towards militancy, and counterterrorism operations on part of the state in the period after 2007 is due to a number of reasons. First, by this time, the hitherto ignored militant groups had by now acquired, and begun asserting power and capability to take on the Pakistani state, which in fact had nurtured the Mujahideen fighters (who eventually became the Taliban) during the Soviet occupation of Afghanistan in the 1980s. The change in attitude of the extremist groups and the state of Pakistan is encapsulated in the following quote by the then President:

> "Let's be truthful to ourselves and make a candid admission of the realities. The terrorists of today were the heroes of yesteryears. But they began haunting Pakistan in the post-9/11 era."
>
> Asif Ali Zardari, President of Pakistan, 07 July, 2009
> (Quoted in Mir, 2009, pp.5)

Secondly, greater pressure from the US to "do more" and demonstrate greater will, also played a role in stepping up military action (Mir, 2009). Further, the failure of peace deals and a sharp increase in violent acts by militant groups within Pakistan and specifically on army and government targets brought the two sides in direct confrontation. This led to a strategic shift on part of Pakistani state and army; from selective confrontation and engagement, to taking on all the extremist groups that had attacked, or were able to attack Pakistani targets. The Pakistani Army launched multiple military campaigns against the TTP and its affiliates. Many of these operations have been intense, long-drawn out and trying; for the armed actors on both sides, as well as civilians caught in the crossfire. Table 2 below lists the main military operations of the Pakistan Army against terrorist outfits in KPK and the FATA.[13]

Table 2. Key Military Operations against Terrorist/ Militant Groups in North-West Pakistan

Name of Operation	**Dates**	**Areas**
Enduring Freedom	2001 – 2002	Along Af-Pak Border
Al Mizan	2002 – 2006	South Waziristan

[13] For more details on the goals and operational effectiveness of these operations see Jones and Fair (2010)

Kaloosha II	2004	South Waziristan
Zalzala	2008	South Waziristan Agency
Sher Dil	2008 – 2009	Bajaur Agency
Rah-e-Haq	2007 – 2009	Swat district
Sirat-e-Mustaqeem	2008 – 2009	Khyber Agency
Eagle Swoop	2008 – 2009	Kohat district
Mountain Scanner	2008 – 2009	North Waziristan Agency
Mountain Sweep II	2008 – 2009	South Waziristan Agency
Rah-e-Raast	2009	Swat district
Rah-e-Nijat	2009 – 2010	South Waziristan Agency
Zarb-e-Azb [a]	2014 –	North Waziristan

Source: Jones and Fair, 2010; a: Thompson, 2014

The on-ground capabilities of the Pakistani Army were relatively low in such terrain. All this led the US to pursue a strategy of counter-terrorism, particularly for high-value targets through a heightened use of military Unmanned Aerial Vehicles (UAVs)/ drones. While the number of people killed by drones was a fraction of the overall fatalities due to terrorism and counter-terrorism operations, its unprecedented use, especially through less-specifically targeted "signature strikes" became a rallying point, against the War on Terror that it had come to symbolise. As drone attacks entered the lexicon of Pakistani political and popular discourse, it raised several questions on the rules and methods of war, both within Pakistan and globally, polarising the debates within the security community, academia and the public. All along, the military campaign has not fully enjoyed the trust of the US as misgivings over the bona fides of elements within the military establishment, with regard to the support of militant groups persist. Cohen (2011) argues that the Army, and its all-powerful Inter-Services Intelligence agency (ISI) in fact views militant groups in operational terms, as instruments to achieve certain goals (Haqqani 2005). This chequered history traces its roots back to the Afghan Soviet war in the 1980s when allegations of the ISI appropriating CIA money meant for the *Mujahideen* did the rounds (Rashid, 2012) and resonates with more recent misapprehensions over support to the regrouping Al Qaeda through the Haqqani Network (Brown and Rassler, 2012; Gul, 2010). Many have reiterated such concerns in light of the discovery that Osama bin Laden had been living in a safe house in Abbottabad, a garrison town with a strong presence of the Pakistan Army, as well as allegations of deliberate inaction against the alleged perpetrators of the terror attacks in Mumbai, India in November 2008 (Fair, 2011; Murphy, 2013).

2.3 Conflict Incidence and Location in Pakistan: Data Sources and Issues

The previous sections have underscored the importance of studying the patterns and trends of the various forms of conflict. This section assesses the available public data sources on conflict incidence and location, and examines how comprehensive and comparable they are. In doing so an attempt is made to identify the challenges in constructing and using event datasets and the caution that they portend, for drawing conclusions and wider implications from such data. I begin with a critical analysis of the building blocks of datasets on conflict events.

2.3.1 Defining Incidents of Violent Political Conflict

In this chapter the focus of study is on violent political conflict, i.e. those acts of violence which are motivated and sustained by a need to assert, exercise or seize power over groups. This is distinct from criminal violence (which is not motivated by the aim to capture or assert power), as well as non-violent political agitation. Yet, there can be much variation in what is considered as violent political conflict. This invokes the role of discretion and judgment in classifying acts of violence as related to political conflict, and the need for codified, even if subjective, means to assess violent incidents. Clearly such assessments must be informed by a deep understanding of the historical, sociological and political context of Pakistan. Equally, the markers for classification must be well-defined; measurable; easily distinguishable from their conceptual opposites (for example a criterion that is clearly an indicator of violence, and not non-violence, for example); and follow an internal logic. The process of evolving guidelines for such categorisation is essentially an exercise in balancing an objective and comparable estimation (of scale, size and location) with a discriminating understanding (of intent, consistency and pragmatism).

Definitions of violent political conflict[14] vary considerably across sources and user-groups. The most influential definitions that dominate international legal practice, and to a large extent public discourse, are derived from the main sources of international law. These include international treaties and conventions, customary international law[15] - specifically the rules of *jus cogens*[16], as well as, to a lesser extent, the general principles of law, and judicial decisions/ juristic writings. In order to illustrate the international-legal approach to defining specific acts of violence, Box 1 presents the definition of acts of terrorism (as an example) in key international conventions and national statutes.

Box 1. Definitions of Terrorism in International Conventions and National Laws

The *proposed* **Comprehensive Convention on International Terrorism of the United Nations** General Assembly (as proposed in 2002, without prejudice to objections raised by several member states, particularly to distinguish the activities of armed forces and movements for self-determination) defines a terrorist act as one that:
(a) Death or serious bodily injury to any person; or
(b) Serious damage to public or private property, including a place of public use, a State or government facility, a public transportation system, an infrastructure facility or the environment; or
(c) Damage to property, places, facilities, or systems referred to in paragraph 1 (b) of this article, resulting or likely to result in major economic loss, when the purpose of the conduct, by its nature or context, is to intimidate a population, or to compel a Government or an international organization to do or abstain from doing any act."

The **United Nations International Convention for the Suppression of the International Financing of Terrorism** defines terrorism as an act "intended to cause death or serious bodily injury to a civilian, or to any other person not taking an active part in the hostilities in a situation of armed conflict, when the purpose of such act, by its nature or context, is to intimidate a population, or to compel a government or an international organization to do or to abstain from doing any act."

The **UN Security Council Resolution No. 1566** defines terrorism as "criminal acts, including against civilians, committed with the intent to cause death or serious bodily injury, or taking of

[14] Hereafter conflict, or violent conflict will refer to violent political conflict, unless otherwise specified
[15] Customary international law is in turn informed by judicial practice by international organisations and by states
[16] A peremptory norm in customary international law is a principle that overrides other sources of international law, and includes in its ambit the prohibition of acts such as war, war crimes, torture, crimes against humanity and genocide.

hostages, with the purpose to provoke a state of terror in the general public or in a group of persons or particular persons, intimidate a population or compel a government or an international organization to do or to abstain from doing any act, which constitute offences within the scope of and as defined in the international conventions and protocols relating to terrorism, are under no circumstances justifiable by considerations of a political, philosophical, ideological, racial, ethnic, religious or other similar nature,"

The South Asian Association for Regional Cooperation (SAARC) Regional Convention on Suppression of Terrorism, Article I (e) defines terroristic [*sic*] acts to include "Murder, manslaughter, assault causing bodily harm, kidnapping, hostage-taking and offences relating to firearms, weapons, explosives and dangerous substances when used as a means to perpetrate indiscriminate violence involving death or serious bodily injury to persons or serious damage to property."

The United Kingdom's Terrorism Act 2000 defines terrorism as the use or threat of action where: (a) the action falls within subsection (2), (b) the use or threat is designed to influence the government or to intimidate the public or a section of the public and (c) the use or threat is made for the purpose of advancing a political, religious or ideological cause.
Further, an action falls within Subsection (2) if it: (a) involves serious violence against a person, (b) involves serious damage to property, (c) endangers a person's life, other than that of the person committing the action, (d) creates a serious risk to the health or safety of the public or a section of the public or (e) is designed seriously to interfere with or seriously to disrupt an electronic system

The US National Counter Terrorism Center [based on the United States Code 22 USC § 2656f(d)(2)] defines a terrorist act as one "premeditated; perpetrated by a sub-national or clandestine agent; politically motivated, potentially including religious, philosophical, or culturally symbolic motivations; violent; and perpetrated against a noncombatant target."

As the examples above indicate, despite a general agreement over what constitutes acts of terrorism, the specific definitions vary across organisations. They may include or exclude certain acts or aspects of violence as necessary to qualify as terrorism. Similarly, databases that track and record conflict events do so based on implicit or explicit criteria that inform their event coding practices. These may be critical to bear in mind particularly when comparing estimates/ trends of conflict across data sources.

2.3.2 Primary Data Sources

This section assesses the main sources of conflict events in Pakistan pertaining to the years 2000 – 2010. I first present an overview of the features of these sources and then compare the broad estimates of conflict as defined and measured by each of them.

1. **WITS:** The Worldwide Incident Tracking System database of the US National Counterterrorism Center. The dataset tracks terrorist incidents between 2004 and 2009 and includes data on the type of attack, and numbers of people killed, wounded and kidnapped. Geo-locators of the events are recorded down to the district level.
2. **BFRS**: The BFRS Dataset, housed at the Empirical Studies of Conflict Project at Princeton University, is based on an extensive coding of all events of political violence reported in the "Dawn", a leading newspaper of Pakistan, from 1988 to 2010. The authors include a comprehensive codebook and methodology notes which indicates that the coding undertaken has been rather detailed, and includes data on groups behind the violence, motives/ motivation, numbers of people killed and wounded and geographic identifiers. The event-wise dataset is publicly available and aggregate figures and trends have been provided by the authors in a working paper (Shapiro *et al.*, 2012).
3. **SATP:** The South Asia Terrorism Portal, run and maintained by the Institute of Conflict Management, New Delhi compiles conflict event data through a daily scan of seven leading Pakistan newspapers. Data are available in narrative format since 2001. The narrative summary contains details of event site (traceable in most cases to the sub-district level), number of fatalities (by type of victim – civilian, military and militant) and people wounded, and the motivation for the attack. SATP apply definite criteria for including and narrating conflict events in their database but do not provide any tabulated versions of the events' summaries.
4. **PIPS:** The Pakistan Institute for Peace Studies, Islamabad, tracks conflict events in the news media and through their own researchers in the field. Data are available since the year 2005 and include the number of fatalities (by type), motivation of attack, groups involved and geographic locators down to the district level.

5. **ACLED:** The Armed Conflict Location and Events Dataset portal provide a list of conflict events in Pakistan relying mainly on news reports of international press agencies, chiefly the AFP, BBC and the CNN.

Table 3 below, adapted from de Mesquita *et al.* (2013) compares the chief attributes of these datasets and their estimates of conflict incidence and impact.

Table 3. Comparing Conflict Event Datasets, 2004 – 2008

Attribute	WITS	BFRS	SATP	PIPS	ACLED
Total Incidents	3268	3686	-		
Total Killed	3823	4567	6991		
Includes non-terrorist violence?	No	Yes	Yes		No
Includes Geographical indicators?	Yes	Yes	Yes	Yes	Yes
Lowest level of location data	District	-	Sub-district	District	
Methodology provided	Yes	Yes	Yes*	No	No
Source	NCTC	Dawn Newspaper	Nine newspapers (incl. Dawn)	Not clear	Foreign Press
Total time period	2004 to 2009	1988 to 2010	2001 *onwards*	2005 *onwards*	
Status of victim indicated?	No	No	Yes	No	No
Groups identified	No	Yes	Sometimes	Yes	No

Source: de Mesquita *et al.* (2013), author's assessments
* Although the SATP does not provide the recording and coding methodology used by them on the portal's website, it was made available to the author privately

As table 3 above indicates, there is considerable variation in the estimates of the total number of incidents recorded as well as the total number of people across the datasets available. This partly results from the difference in definitions of conflict events used by the alternate sources, as well as the fact that their primary data sources vary. The spatial non-comparability of data due to differences in the lowest level at which conflict events are geo-coded proves another challenge. Such variations, though hardly unexpected given the difficulties in obtaining precise reporting of every violent act in Pakistan, is non-trivial when generalising results from one data source without considering how sensitive they may be to changes in measurement/ definition/ location markers.

On the positive side, the availability of alternate data sources can enable researchers to compare at least some trends and patterns in the manifestation of violence. On the other hand, differences in definitions chosen, recording and coding methodologies employed, primary sources used, geographical units identified and time periods considered make it exceedingly difficult to study very wide-ranging and alternate aspects of violence whilst retaining comparability across sources. All this means that the limitations of the existing data sources would invariably lead researchers to adopt a more restricted/ cruder operational measure of conflict than what would be ideal, based on a fuller academic understanding of the concepts of violence, has to be used.

With the exception of the Worldwide Incidents Tracking Survey (WITS) dataset compiled by the National Counterterrorism Center (NCTC) that uses intelligence reports as the primary data source, available conflict event datasets in Pakistan rely on news media reports as their primary source of data. Identified news publications are continually monitored, and relevant conflict reporting is summarized and coded to record pre-determined details. This is broadly the methodology adopted by leading conflict event datasets on Pakistan, namely the South Asia Terrorism Portal, the Pakistan Institute of Peace Studies and the BFRS project of the International Growth Centre, London.

The limitations of such sources need to be acknowledged. First, by its very nature, news reportage tends to pay more attention to larger and more severe forms of violence than lower intensity ones. For example it is much more likely that a lone incident of killing would receive greater media attention than periodic eruptions of violence where communities come to blows but violence does not result in fatalities. While the two levels of violence intensity may indeed show strong temporal and spatial correlation, by relying only on media sources we tend to focus more on acts of high intensity violence.

Another likely bias in reportage could arise from the proclivity of media agencies to report on incidents that occur in urban centres and well-connected areas. The reason for this bias need not only be because of a greater demand from readers of events closer to them, but also because media houses may have a weaker network of correspondents in more remote and isolated areas. It is only after violence reaches a certain level in isolated area in a particular conflict theatre that there may be a need for media groups to station permanent correspondents who report from near the conflict-affected areas. Then too, the ability to collect news may be somewhat limited resulting in under-reporting.

Security risk can directly make accurate reportage more dangerous and therefore less likely than in other settings. Journalists face serious security threats from parties in a war which can deter access and continuity of coverage over the course of an unfolding war.

Thirdly, news media often themselves rely on official press briefings (of the Inter Services Public Relations, the main Information office of the Army in Pakistan), or statements issued by spokespersons or representatives of the Taliban. Relying only on such sources may be problematic as they may for instance have the incentive to under-report deaths of their own and claim higher killings of their adversaries. Journalists as such may have little opportunity to validate claims and numbers and conduct their own investigative operations in areas where violence is very high and journalists' security is not easily assured.[17]

Often the motives of violence are not clear. What may appear to be a terrorist attack on a girls' school in an area dominated by a Shi'as may in fact be a sectarian attack meant specifically against the group, or it could be an attack motivated by an opposition to girls' schooling. The motive for violence is problematic to disentangle as there is an inherent chance of confounding simultaneously existing constituents of people's identities and also because violence can have multiple motives.

[17] It is noteworthy that for the years 2008 – 2012 Pakistan has consistently been regarded as one of the most dangerous country for journalists – both national and foreign – in the World Press Freedom Review.

Finally the geographic location of conflict events is not always clear in media reports. Press reports often do not mention the names of villages/ sub-districts where events have occurred and there is often no way to trace these back. For example when landmine explosions take place on roads connecting two district capitals, news reports often mention only the name of the highway, and not where exactly the attack occurred. Consequently it would not be possible to determine which district the event occurred in.

The remarks above provide the necessary reason for caution in using conflict event datasets and drawing conclusions from them. The fact remains that these are the best available sources of data on conflict events in the country. Despite the many shortcomings of using media reports as primary data, it must be noted that Pakistan has a high number of media agencies and that conflict reportage is considerable, and has been growing over the last decade. Further, given the low level of Information Technology penetration in rural areas and the absence of agencies that record and monitor direct reports of conflict from households using telephone/ internet connections, print media reports are likely to be the most broad-based and comprehensive source of events available.

I choose to use the SATP dataset among all the datasets mentioned above for the analysis in this and subsequent chapters due to key advantages:

i. Comprehensiveness and clarity of sources: SATP collates reports from nine leading Pakistani newspapers – this approach relies on open source data and the veracity of SATP's conflict event timelines can be immediately established by checking the conflict event summary in the SATP timeline against the original source of the news item online. This eliminates the scope of any systematic doctoring while going from independent news reports to documented conflict event summaries on the SATP website

ii. Time Period covered: The SATP timeline for Pakistan begins in 2001 and continues to this date, which allows a meaningful compilation of conflict events and fatalities over a long time period and since conflict in Pakistan escalated following the 9/11 attacks and the US-led War on Terror.

iii. Consistency: The SATP have used a uniform and consistent approach in recording conflict events over the 2001-10 period, which enables making comparisons over time, as well as correctly aggregating the number of events of conflict and the number of people killed in attacks.

iv. Precise geographical identifiers: SATP attempts to locate the most precisely available location where the particular conflict event occurred. This allows a higher majority of incidents to be located to the *tehsil* (sub-district) level than any other source

v. Details of victims' identities: To the extent possible, and as has been noted above that this is not always accuarately possible, the SATP timeline attempts to provide disaggregated counts of fatalities in conflict across civilian, military and militant categories, for example.

All these factors were key in selecting the dataset best suited for conducting disaggregate and sub-national level analysis of conflict.

There may be a valid concern for neutrality given that the SATP is hosted at the Institute of Conflict Management, an India-based think tank which, to some minds, may have implications especially for reportage on the disputed territory of Kashmir. While I have been able to ascertain that the sources and methodology used by the SATP for recording violent incidents in Kashmir is the same as in the rest of Pakistan, for the current analysis, I expressly exclude all incidents in the Azad Jammu and Kashmir (AJK) and Gilgit Baltistan (GB) provinces, restricting the analysis therefore to Punjab, Sindh, Balochistan, KPK and FATA. For the rest of Pakistan, the concerns of the lack of neutrality are less serious[18] especially as Pakistani newspapers are consulted, and conflict event summaries on the SATP timeline can immediately be matched and verified against the original news reports that form the source of the dataset. Secondly, in order to be sure of no systematic spatial and time-varying biases, a spatial and time correlation of district-wise fatality estimates between SATP and BFRS datasets[19] was conducted.

[18] An assessment shared by several country and subject experts with the author in discussions
[19] The two sources differ slightly in terms of the breadth of sources consulted and definitions used to include incidents; yet as subsequent sections will show, the broad trends of the BFRS data are reflected in the SATP

2.4 SATP Conflict Event Data: Definitions, Methodology and Analysis

This chapter presents the first ever estimates of conflict incidence at and location at sub-provincial levels using the South Asia Terrorism Portal conflict events timeline for Pakistan. The SATP conflict events timeline has been used as the main source of conflict data in a small but growing body of empirical work on spatially disaggregated conflict analysis in South Asia, particularly India (Tranchant *et al.*, 2014; Eynde, 2011; Khanna and Zimmerman, 2014; Fetzer, 2014), but also including Nepal (Williams *et al.*, 2012). Its use for Pakistan, however, has been more limited and only restricted to provide aggregate national-level statistics (such as Rakisits, 2012; Khan and Mussarat, 2014).

The SATP define terrorism in broad terms, to include a broad range of acts of political violence that go beyond other, stricter definitions of terrorism employed by other sources, such as those listed in Box 1. Specifically, the SATP made available the following definition and explanation of the criteria they employ for recording conflict events:

> "Terrorism is an act or acts of criminal violence, or the sequence of actions leading to such an act or acts, which is/are intended to intimidate the public, coerce or unduly compel a Government or public authority to perform or abstain from performing any act; or to destabilize or destroy the fundamental political, constitutional, economic or social structures of a country; or to overawe any public functionary or Government agency."
>
> Further, they state that: “We [SATP] recognize various limitations in this definition, particularly in grey areas involving the increasing overlap between insurgency and terrorism. However, neither these difficulties, nor this definition itself, have any significant bearing on our database. Our data is compiled from multiple open sources, and while some effort at verification from local sources is exerted where conflicting reports on a particular incident appear, the casualty/fatality data overwhelmingly accepts the categorization - terrorist, civilian and security force - indicated in the various open sources on which we rely. There is no attempt to reconcile each listed incident with any consistent definition of terrorism. Further, we include security force and terrorist/militant fatalities in our database as well, on the grounds:

i. That such data is of immense importance in trend analysis and assessment of the activities and operational potential of terrorist groups;
ii. Terrorism is not just the final act of criminal intimidatory violence alone; it is a complex and continuous chain of events leading up to the act of terror; and this chain includes, inter alia, the killing of security force personnel and other public functionaries."

While analysing the SATP conflict event timeline it was evident that the timeline recorded violence of several forms in Pakistan. As such, it is not restricted to recording conflict events pertaining only to militant and counter-militant violence involving the TTP and affiliate groups (which I go on to characterise as terrorist and counter-terrorist violence). The SATP definition of terrorism, and consequently their timeline records, are therefore broader than this more precise form of terrorist violence (limited to TTP affiliates and jihadi militants), and also distinctly includes events pertaining to sectarian, communal, ethnic, insurgent and tribal violence. I define each of these motivations of violence while classifying the conflict events in the SATP timelines under these categories and state the operational definition used for this in the following section.

2.4.1 Methodology

The SATP website does not clearly mention the methodology used to identify and then collate the event timeline, and this may be problematic for research quality. In order to be sure of the methodology employed, I personally contacted the Institute of Conflict Management, New Delhi to obtain details of the steps and procedures followed.

The analysis in this chapter is based on an extensive coding and tabulation of the narrative report of conflict incidents recorded by the SATP and made publicly available on their website. Prior to this no known exercise to codify and tabulate this data has been undertaken and existing briefing reports/ summaries by the SATP team only provide aggregate(national), provincial and thematic (again at the national level) analysis of conflict trends. The SATP conducts a detailed media scanning exercise to build the conflict event timeline for Pakistan that is subsequently made available on their website www.satp.org. The conflict timeline was accessed on the website in August 2012. The media monitoring conducted by SATP includes nine leading English language newspapers in Pakistan. These are:

1. Daily Times
2. Dawn
3. The News
4. The Express Tribune
5. The Nation
6. Pakistan Observer
7. Frontier Post
8. Pakistan Today
9. Central Asia Online

The SATP research team conduct a daily scan of news articles pertaining to violent conflict – defined by events involving fatalities or others of very serious nature[20] (such as attacks on convoys of trucks to supply items to NATO forces) – in these newspapers and triangulate details (of location, number of fatalities etc.) across the newspapers. They conduct checks with local affiliates in Pakistan and employ a defined decision rule to tackle cases with varying estimates and often report such variance within their timeline summaries as well. The narrative description provides details of the numbers of people killed (typically including a break-up to indicate civilian, military and militant/ insurgent fatalities), numbers wounded, geographical location as reported in the news item, and where available, the motivation for the attack and the main initiator. Based on the narrative summary, I developed my own criteria for assessing the motive of particular conflict events, and present these working definitions later in this section.

The conflict timeline for the period under consideration is 01 January 2001 – 31 May 2010. Details recorded include the date and location of the attack, the profile of the dead, the motivation for the attack, event location to the lowest level possible, the initiator of the attack, and dummies to indicate drone strikes, suicide bombings and failed attacks. Once the data were entered, the geographical location of the conflict sites was reconfirmed

[20] Significantly, it does not systematically record instances of kidnappings unless the hostage is killed

using the 2012 Pakistan Census Office classification of Provinces, Districts, *tehsils* (sub-districts) and union councils/ villages. All *tehsils* and districts were located for incidents in Punjab and Sindh. In Balochistan *tehsils* could not be identified for 8 of 160 incidents that accounted for 3.43% of total fatalities. For KPK *tehsils* could not be identified for 110 of 769 incidents, accounting for 17.83% of total fatalities. Table 4 below shows the status of district and *tehsil* identification in the conflict events under consideration. For a random selection of 105 of the total 1,051 incidents recorded, I conducted a back-check to ascertain accuracy in entry and minor changes were made to entries for two incidents. Estimates of conflict incidence and intensity were computed at the national, provincial and district levels. These are summarised in the following section.

Table 4. Non-Identification of Districts and *Tehsils*, by Province

	Incidents*		Fatalities			
Province	District Not Identified (%)	*Tehsil* Not Identified (%)	District Not Identified (%)	*Tehsil* Not Identified (%)	Total Incidents*	Total Fatalities
Balochistan	1 (0.63)	8 (5)	4 (0.39)	35 (3.43)	160	1,019
KPK	7 (0.91)	110 (14.3)	65 (0.8)	1,443 (17.83)	769	8,095
Punjab	0 (0)	0 (0)	0 (0)	0 (0)	66	1,055
Sindh	0 (0)	0 (0)	0 (0)	0 (0)	56	495
Total	8 (0.76)	118 (11.27)	69 (0.65)	1,478	1,051	10,664

* Incidents only refer to those involving fatalities of one or more person(s)

2.5 Results

2.5.1 Aggregate Results

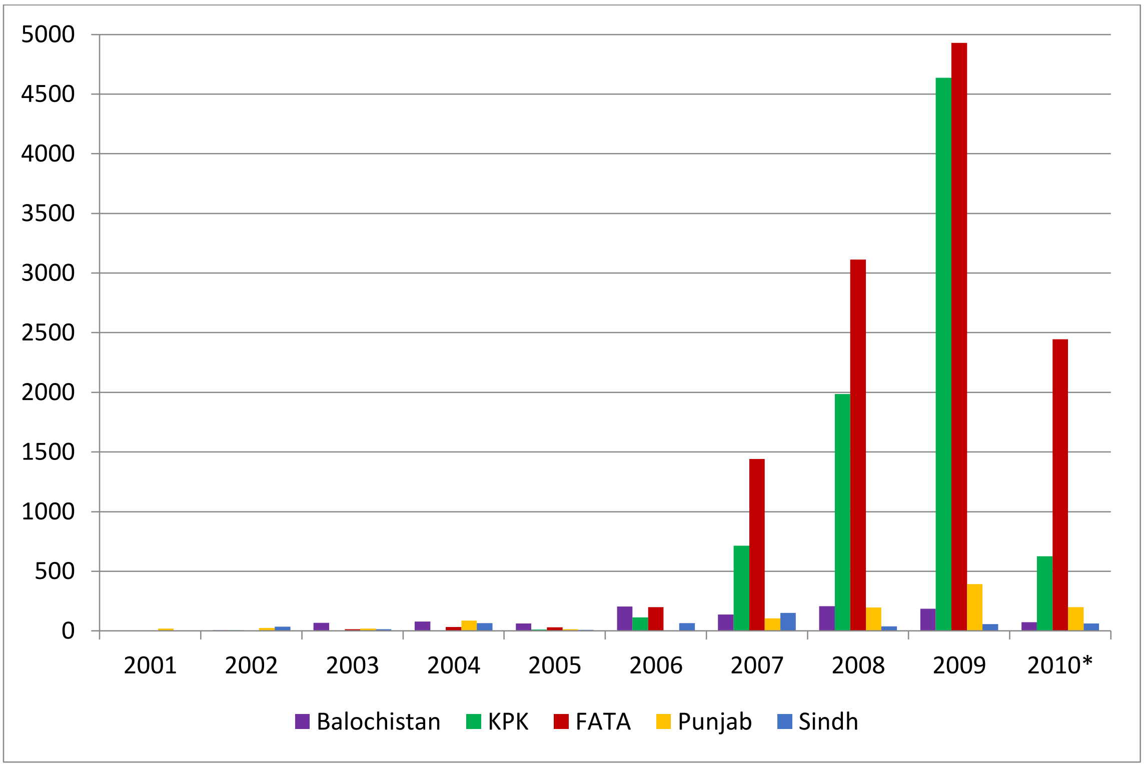
I first analyse broad nationwide trends in conflict between 2001 and 2010. Table 5 below shows the break-up of the province-wise total number of fatalities due to conflict. This includes deaths of civilians, militants/ insurgents, security forces and police combined. These figures represented graphically in Fig. 1.

Table 5. Total fatalities due to Conflict in Pakistan: Jan 2001 – May 2010

Year	Balochistan	KPK	FATA	Punjab	Sindh	TOTAL
2001	0	0	0	18	1	**19**
2002	5	6	4	25	35	**75**
2003	67	0	14	20	13	**114**
2004	78	0	34	86	64	**262**
2005	61	12	31	14	9	**127**
2006	204	112	198	0	66	**580**
2007	137	714	1441	106	151	**2,549**
2008	207	1987	3113	197	38	**5,542**
2009	186	4637	4930	391	57	**10,201**
2010*	74	627	2446	198	61	**3,406**
TOTAL	**1,019**	**8,095**	**12,211**	**1,055**	**495**	**22,875**

Source: Authors' calculations based on South Asia Terrorism Portal conflict timeline for Pakistan

Fig 1. Fatalities due to Conflict in Pakistan: Jan 2001 – May 2010



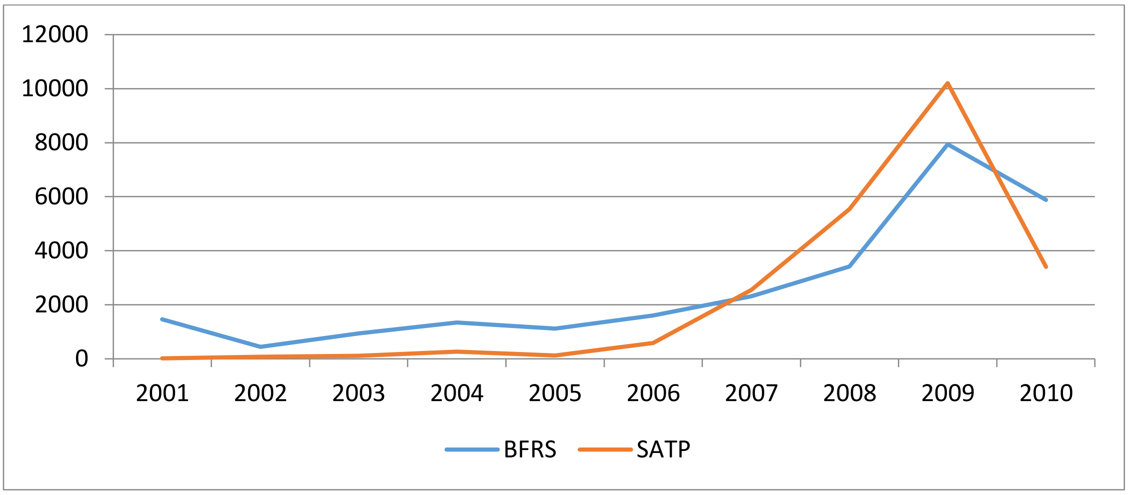
Source: Authors' calculations based on South Asia Terrorism Portal conflict timeline for Pakistan

The inter-province distribution of deaths due to violence is noteworthy. In initial years Balochistan, Punjab and Sindh account for the highest concentration of conflict-related deaths while the frontier areas of the FATA and KPK are noticeably peaceful. However after 2005, not only does the scale of deaths counted magnify, the regional patterns also seem to have been reversed. FATA and KPK account for the majority of deaths and also show the fastest growth of the body count among the provinces. The data confirm a plausible expectation of contagion of conflict into Pakistan through the Durand Line[21] as the US-led war on terror in Afghanistan intensified and groups affiliated to the Taliban moved into Pakistan, regrouped and were buttressed by local groups in Pakistan who were opposed to the Pakistani government's support to the US.

It is clear from the table and graph above that there has been an astounding increase in the fatalities from conflict since the year 2006, in varying degrees across the provinces. The years preceding 2006 had relatively low levels of violence, and typically concentrated in urban centres. 2006 shows a massive jump which is accelerated in the following years. This finding is also reflected in work by Shapiro and Gulzar (2012) using the BFRS dataset. Fatalities from violence peak in the year 2009. The concentration of several military operations, described in Table 2, in 2009 perhaps indicates both the high number of fatalities in that year, as well as a slight dip thereafter as many of the operations ended successfully, even if at a huge cost to lives, by 2010. Fig. 2 below compares the trends in total fatalities over the period between the SATP and BFRS datasets. While the overall trend is similar in the two sources, the total numbers varies due to differences in both definitions of incidents to be included to measure fatalities, as well as the range of sources used.

[21] The Durand Line is a historic border created by the British during their colonization of India to separate India from Afghanistan. While the cartographic record of the Line has a long history, it has in fact always been a highly porous, and therefore nominal border between Pakistan and Afghanistan.

Fig 2. Fatalities due to Conflict in Pakistan 2001 –2010: BFRS and SATP data



Source: Authors' calculations based on South Asia Terrorism Portal conflict timeline for Pakistan, BFRS (2013)
*SATP figures for 2010 are only until 31 May

On the whole, the BFRS records 3299 more fatalities than the SATP for the entire period; the average district has 22.75 more fatalities than the SATP as per the definitions adopted and sources used. In terms of fatalities per 10,000 of population, the SATP dataset records 6.34 more fatalities per 10,000 of the population than the BFRS for the entire period. For the average district, the SATP estimate of fatalities/10,000 is 0.04 more than the BFRS estimate. Over the 2001-10 period Estimates of fatalities due to conflict are higher in the SATP dataset for FATA and KPK (by approx. 84 and 78 fatalities, respectively) compared to the BFRS. In contrast it appears that SATP considerably underestimates fatalities in Sindh (by about 132 fatalities). We now examine the profile of the dead across six distinct categories: civilians, security forces, police, militants/ terrorists, militia fighters and insurgents. Table 6 below provides the percentage distribution of fatalities by these categories over the years 2001-2010.

Table 6. Percentage Distribution of Fatalities Due to Conflict, by type of victim

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	All
Civilians	94.7	77.3	74.6	82.4	84.3	37.4	41	20.1	16.9	23.2	23.5
Security Forces	0	9.3	2.6	13.7	3.9	22.1	12.3	5.4	6.2	4.1	6.9
Police	0	4	11.4	1.5	0	2.4	2.4	1.7	1.5	1.1	1.6
Private Militia*	0	0	0	0	7.1	2.1	2.4	3.5	1.1	0.5	1.7
Militants/ Terrorists	0	8	11.4	2.3	1.6	19.8	34.5	60.2	66.7	69.2	59.1
Insurgents	0	1.3	0	0	0	16.2	0.2	0	0	0	0.4
Unknown	5.3	0	0	0	3.1	0	7.4	9.1	7.6	1.9	6.7

Source: Authors' calculations based on South Asia Terrorism Portal conflict timeline for Pakistan
*locally known as *lashkar*

We observe that over the years as the scale of violence has gone up dramatically, the share of civilian fatalities has reduced. For all the years combined, the average percentage of civilian deaths in total deaths in conflict is 23.5%. Security forces accounted for high proportion of fatalities in 2006 and 2007 but this share has been much lower in more recent years. On the other hand, the share of militants/ terrorists in the body count has been increasing. Insurgents, members of *lashkars* (private militias) and police account for a very small share in total killings.

2.5.2 Conflict Incidence by Motivation

As discussed earlier in this paper, there are several on-going conflicts in Pakistan that manifest in acts of violence and killings. These include terrorist/ militant violence, sectarian strife, and insurgency/ separatism. I identified and recorded the motivation for all the acts of violence in the SATP conflict event timeline based on rough decision rules and operational definitions for the alternate motivations of violence. The classification is therefore based on my assessment of the narrative description of conflict events based on the broad definitions stated below, and is not an artefact of the SATP timeline itself. The alternate motivations for political violence in Pakistan considered in the subsequent analysis include:

i. Terrorist/ counter-Terrorist: This refers to the use of force by militant groups affiliated to the Afghan and Pakistani Taliban/ TTP, other (non-sectarian) jihadi groups, and acts of confrontation and military operations by the security forces (including the Army and the Frontier Corps and the police) against such groups, or (in very few cases) the targeting of such militant groups by para-military groups led by tribal leaders.
ii. Communal: This refers to clashes between religious communities, particularly to attacks on Christians, Hindus and Ahmadiyas.
iii. Sectarian: This refers to violence between Shia and Sunni groups, or any targeting of groups/ individuals primarily because of their sectarian identity.
iv. Insurgent: While some affiliate groups of the TTP claim to be freedom fighters and to overthrow the Pakistani state, in this classification, insurgency is used to refer exclusively to the Balochistan insurgency, which seeks to break Balochistan away from Pakistan and which often takes on violent forms in terms of attacks on the Pakistani state and institutions, as well as involves attacks by the Pakistani Army on rebels to crush the insurgency.
v. Tribal Rivalry: This refers to instances of fighting between different tribal groups for political power, or due to local disputes, but expressly not involving any terror groups, or any sectarian motive.
vi. Ethnic: This refers to violence between individuals/ groups along ethnic lines

Table 7 below examines the main motivations for violence across the provinces to locate concentrations/ dispersions in the types of conflict that afflict particular provinces.

Table 7. Fatalities in Conflict by Motivation of Incident and Province: Jan 2001 – May 2010

Motivation	Balochistan	KPK	FATA	Punjab	Sindh	Total	%
Counter/Terrorist	461	7,767	11,758	783	363	21,132	92.38
Communal	0	0	2	45	0	47	0.21
Sectarian	189	278	425	223	132	1,247	5.45
Insurgent	335	0	0	0	0	335	1.46
Tribal Rivalry	0	48	8	0	0	56	0.24
Ethnic	8	0	0	0	0	8	0.03
Unknown	26	2	18	4	0	50	0.22
Total	1,019	8,095	12,211	1,055	495	22,875	
% Counter/Terrorist	45.24	95.95	96.29	74.22	73.33	92.38	
% Sectarian	18.55	3.43	3.48	21.14	26.67	5.45	

Source: Authors' calculations based on South Asia Terrorism Portal conflict timeline for Pakistan

Table 7 reveals dispersions in the motivations underlying conflict-related fatalities across provinces in Pakistan. First, we observe that violence by and against militants/ terrorists is responsible for the greatest share of deaths across all provinces. The extent of predominance, however, ranges from about 45% in Balochistan to as high as a little over 96% in the FATA. While the conflict in KPK and FATA stems mainly due to the prevailing terrorism and militancy, in Balochistan we observe that sectarianism and insurgency are also compelling motivations underlying conflict-related deaths.

However as FATA and KPK account for the highest levels of violence in the country, the dominance of counter/terrorist violence in Pakistan is absolutely clear; 92.38% of all conflict-related fatalities in Pakistan are due to terrorist violence and counter-terrorism operations. The next highest category is that of sectarian violence which claimed 5.45% of the lives lost to conflict over the period under consideration. Sectarian conflict is more important in the comparatively more peaceful provinces of Punjab and Sindh.

I now turn attention to the specific case of civilian deaths in conflict events to examine which types of violent conflict affect the common population (and not everyone including armed groups), and if this varies across the provinces.

Table 8. Civilian Fatalities in Conflict by Motivation of Incident and Province: Jan 2001 – May 2010

Motivation	Balochistan	KPK	FATA	Punjab	Sindh	Total	%
Counter/Terrorist	238	1892	1168	523	312	4,133	76.76
Communal	0	0	0	44	0	44	0.82
Sectarian	168	252	395	192	125	1,132	21.03
Insurgent	47	0	0	0	0	47	0.87
Tribal Rivalry	0	0	3	0	0	3	0.06
Ethnic	8	0	0	0	0	8	0.15
Unknown	10	0	7	0	0	17	0.32
Total	471	2,144	1,573	759	437	5,384	
% Counter/Terrorist	50.53	88.25	74.25	68.91	71.40	76.76	
% Sectarian	35.67	11.75	25.11	25.30	28.60	21.03	

Source: Authors' calculations based on South Asia Terrorism Portal conflict timeline for Pakistan

Table 8 above indicates a slightly different pattern of vulnerability to death from alternate types of conflict for civilian populations, compared to totals including armed groups[22]. Most visibly, while terrorist/counter-terrorist acts continues to be the highest claimant of civilian lives (accounting for almost 77% of all civilian deaths due to conflict, nationally), sectarian violence plays a larger role than it does in total killings. About 21% of civilian deaths were due to sectarian violence. This was a particularly high-proportion claimant of civilian lives in Balochistan. Other types of conflict claim very small shares of civilian fatalities across the provinces, with the exception of insurgent violence in Balochistan which was responsible for about 10% of civilian deaths caused by violence in the province.

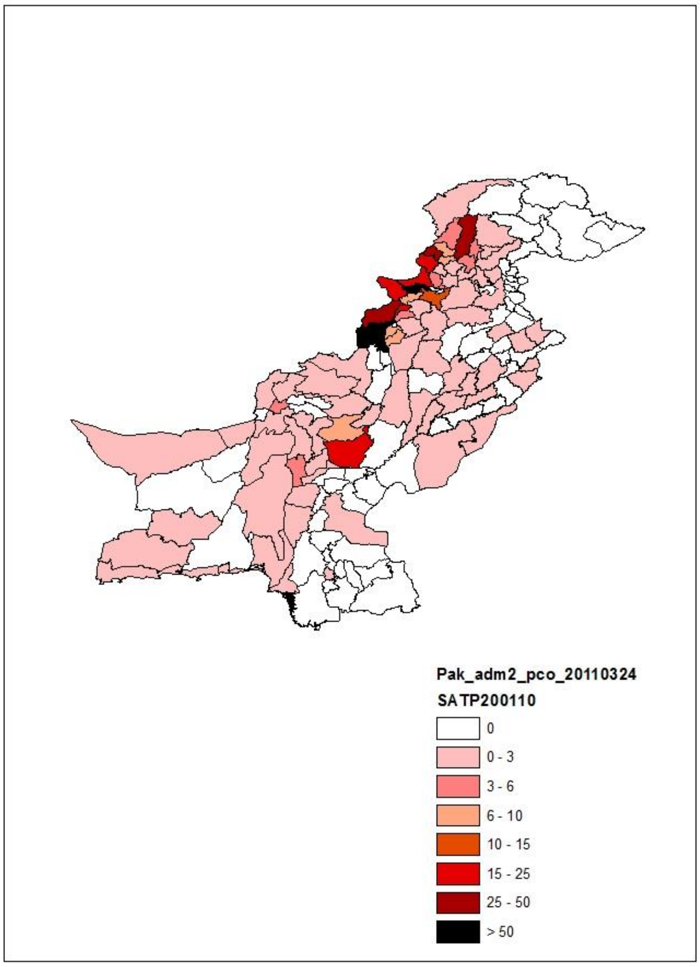
[22] This includes militants, security forces, police, insurgents and militia

2.5.3 District and *tehsil*-level conflict incidence

I measure conflict exposure at the district level as the total number of conflict-related fatalities per 10,000 of the population, by the SATP and BFRS datasets respectively. This is based on an extensive exercise of mapping conflict incidence at the district (agency) level for the Federally Administered Tribal Areas (FATA) and the four major provinces of Pakistan: KPK, Punjab, Sindh and Balochistan. Note that the two sources use different time periods and slightly different definitions to count "total fatalities". District-wise population figures are based on the 1998 census estimates, the latest available official census figures for Pakistan. The Pearson's Correlation Coefficient between the total fatalities per 10,000 of the population at the district level between the SATP and BFRS data sources was calculated to be +0.96, which shows a very strong positive association (The corresponding coefficient for total fatalities by district was +0.91, which is also considerably high). As the BFRS dataset does not extensively identify tehsils for the violent conflict events recorded, and owing to the high number of fatalities and incidents in the SATP dataset for which the tehsil cannot be identified, it is not possible to provide similar estimates of correlation at the tehsil level. However, in later chapters (3 – 5), I measure conflict incidence at the tehsil level as the natural log of 1 + n, the total fatalities due to conflict in the tehsil, according to the SATP. All the primary sampling units in the household survey dataset used in Chapters 3 – 5 lie in districts where tehsils were identified for all incidents. This ensures that the tehsil-level measure of conflict exposure is not affected by the non-identification issue.

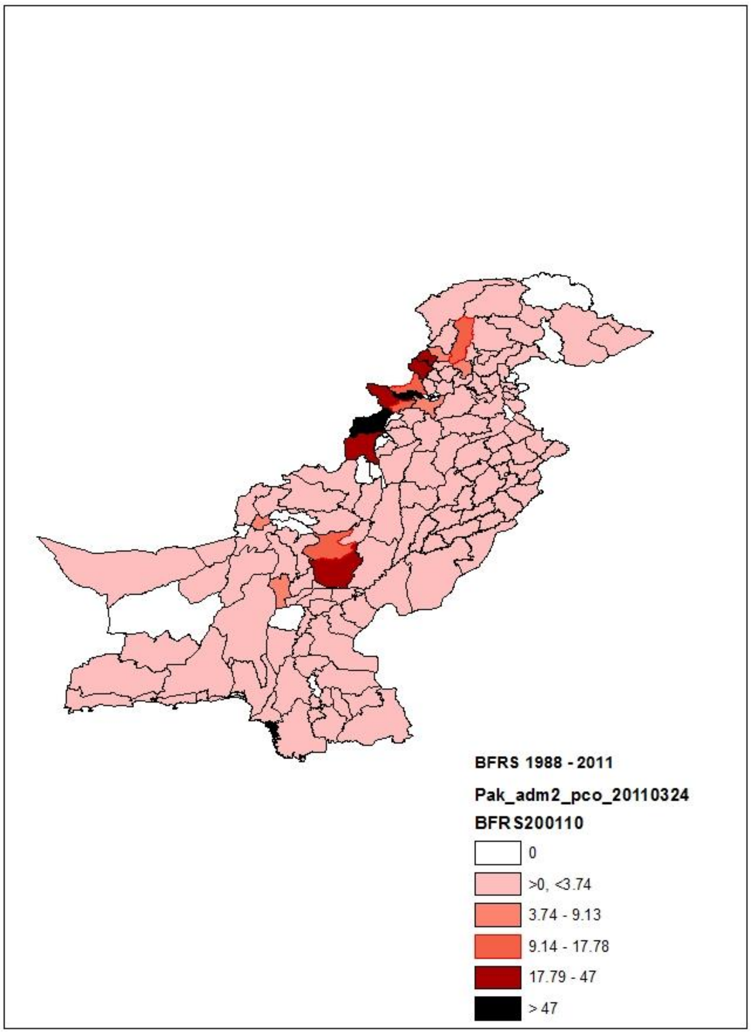
Based on the district-level exposure of conflict (measured as the fatalities due to conflict, per 10,000 of population), I represent the concentration and spread of violence in Pakistan over the period 2001 – 10. Maps 1 and 2 below compare the district-wise incidence of fatalities due to conflict according to the SATP and BFRS datasets, respectively.

Map 1. District-wise Total fatalities per 10,000 of population due to Conflict in Pakistan: Jan 2001 – May 2010: SATP



Source: Author's calculations using SATP data

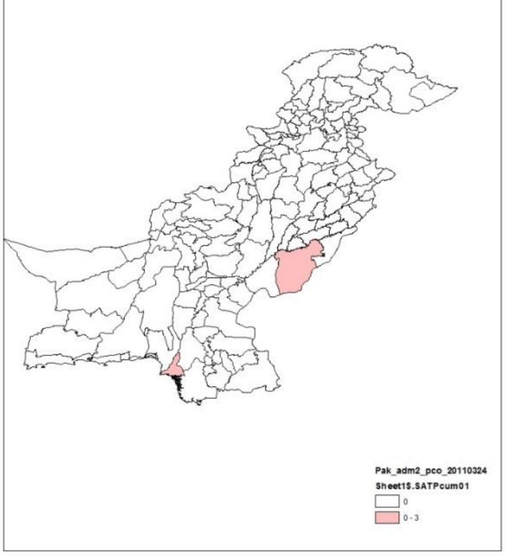
Map 2. District-wise Total fatalities per 10,000 of population due to Conflict in Pakistan: Jan 2001 – May 2010: BFRS



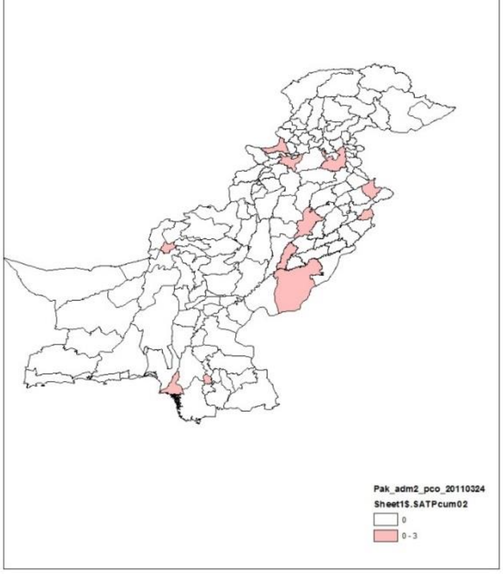
Source: Author's calculations using SATP data

I now depict the year-wise (and cumulative)Total number of people Killed per 10,000 of (1998) population in Political Violence in Pakistan from 2001 – May 2010 in Maps 3 – 12, based on data from the SATP conflict event timeline.

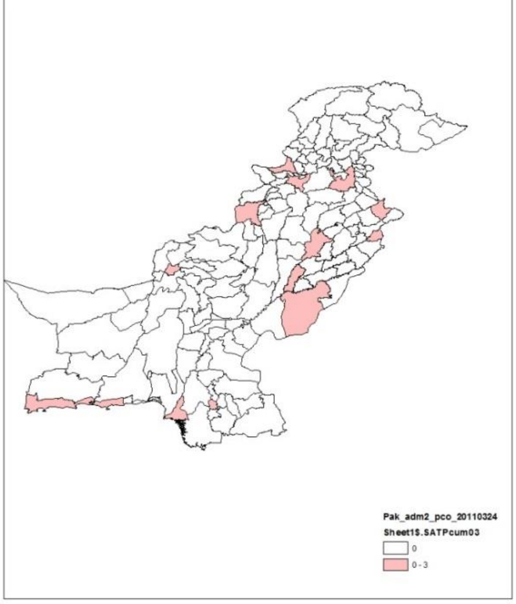
Map 3. 2001



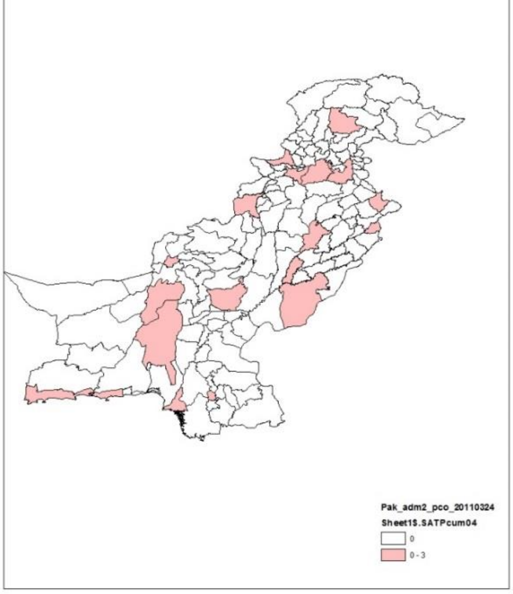
Map 4. 2001 - 02



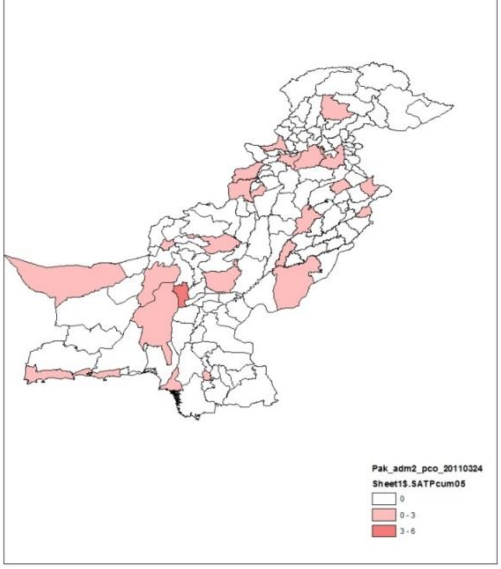
Map 5. 2001-03



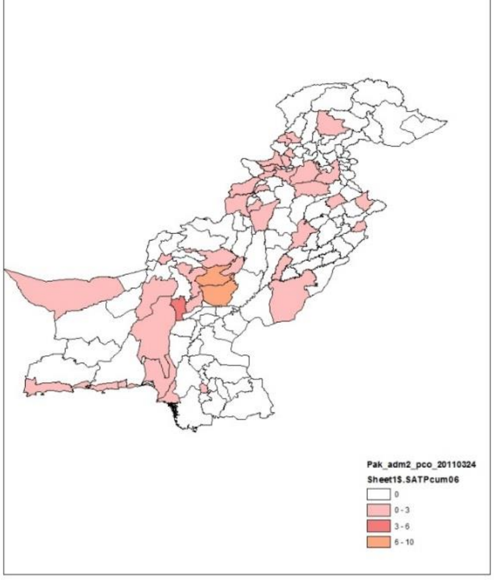
Map 6. 2001-04



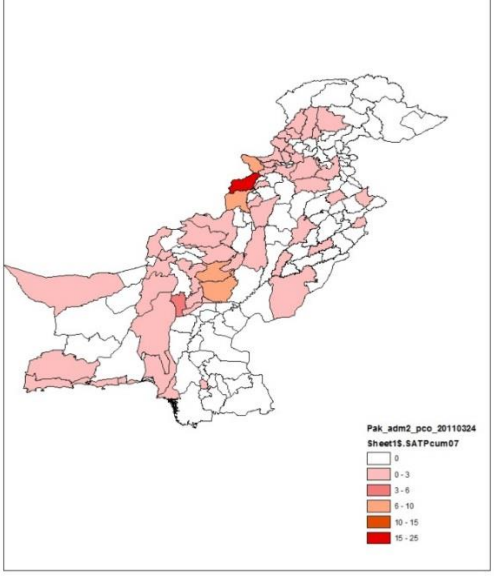
Map 7. 2001-05



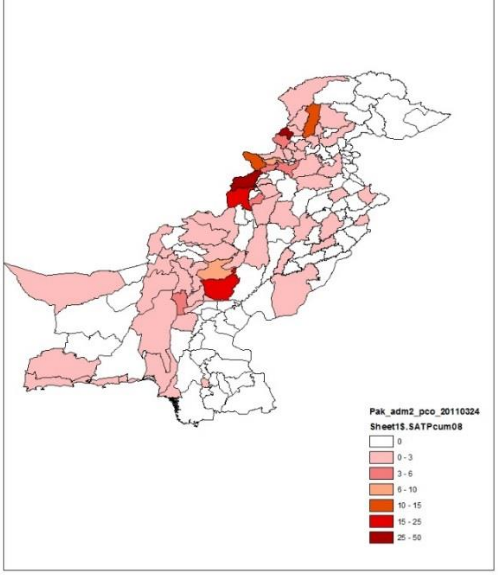
Map 8. 2001-06

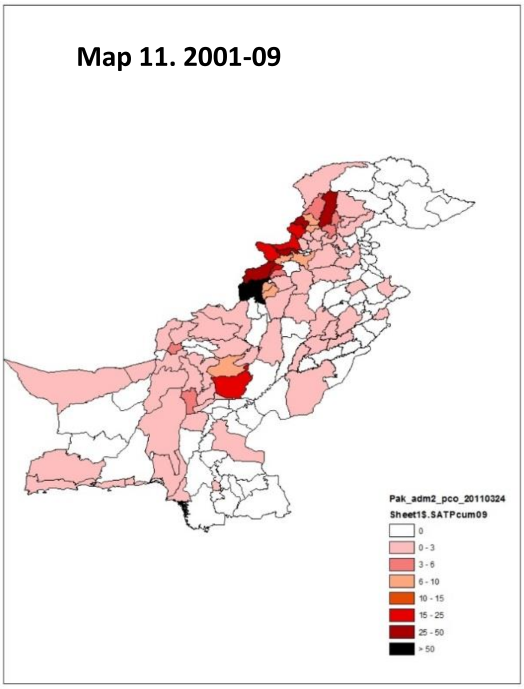


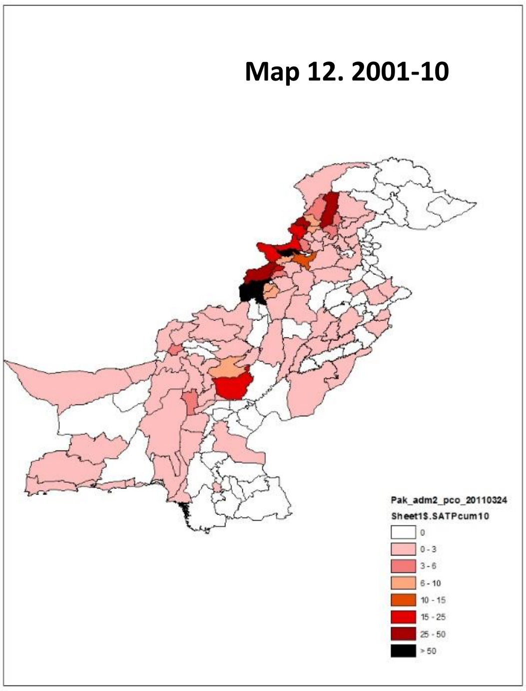
Map 9. 2001-07



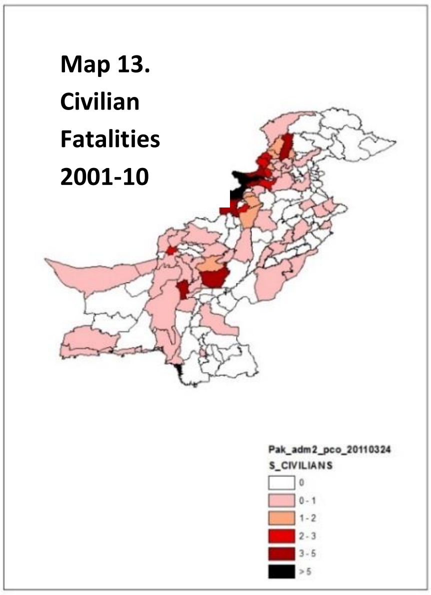
Map 10. 2001-08

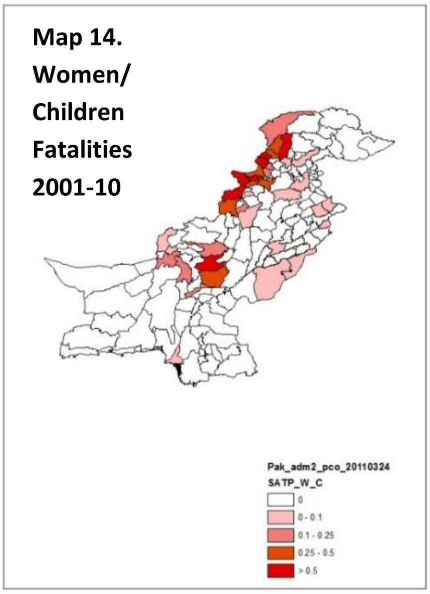




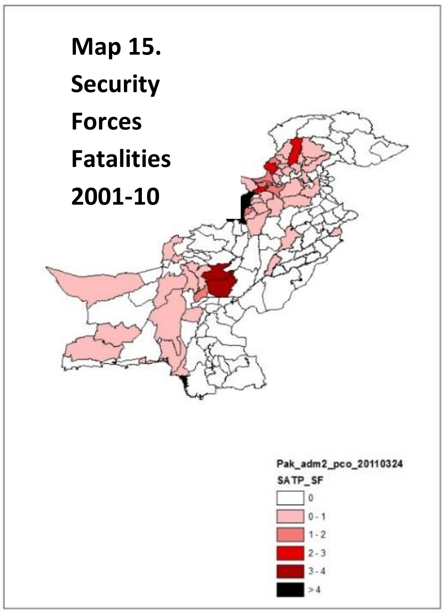


I now depict the year-wise (and cumulative) Total number of Civilians, and Women and Children Killed per 10,000 of (1998) population in Political Violence in Pakistan from 2001 – May 2010 in Maps 13 and 14, respectively, based on data from the SATP conflict event timeline.

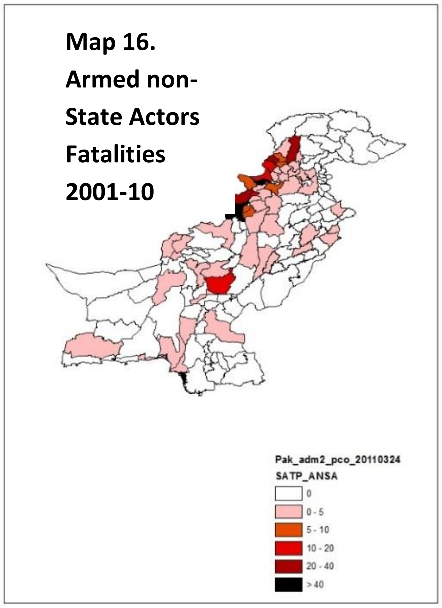




I now depict the district-wise intensity of Combatants, including, both, Security Forces (Army, Frontier Corps and Police), and Armed non-State Actors (militants and insurgents) Killed per killed between 2001 – May 2010 in Maps 15 and 16, respectively.

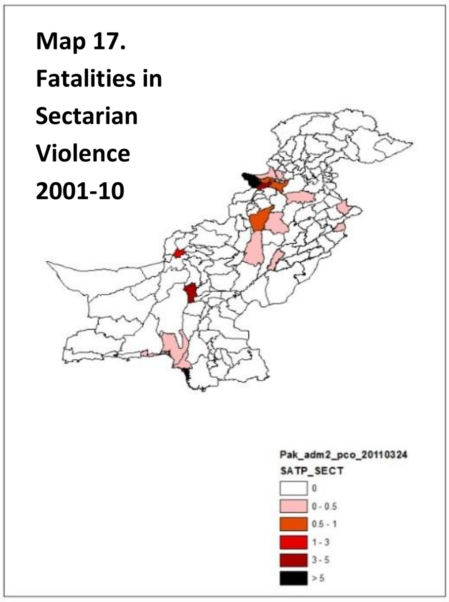


Map 15. Security Forces Fatalities 2001-10



Map 16. Armed non-State Actors Fatalities 2001-10

Finally, Map 17 below shows the number of people killed in sectarian violence per 10,000 of the (1998) population over the period 2001 – May 2010.



Map 17. Fatalities in Sectarian Violence 2001-10

2.6 Summary and Conclusions

This chapter has attempted to provide a broad overview of the trends and patterns of violent conflict in Pakistan in recent years. While violent conflict has afflicted Pakistan since its creation in 1947, it has intensified since 2004-05, resulting in a very steep escalation of the incidence of violence as well as its toll on life and property.

In large measure, this intensification has been due to the raging War on Terror in neighbouring Afghanistan, and its spill over into Pakistan. Terrorist attacks in Pakistan have been motivated by the resentment of Pakistan's support to the US-led offensive against the Taliban in Afghanistan. Local extremist groups have also gained strength and have demonstrated the ability to strike with impunity. These groups have exercised violence to seize control of areas and subsequently enforce diktats on social order as well as secure their base for extraction. They also attack members of specific communities such as *Hazara* Shias. In other instances the targets have been large crowds and gatherings in Pakistani cities or specific symbolic targets – the aim appears to be to challenge the Pakistani state's writ and rebel against its anti-Taliban policy in Afghanistan and the FATA; and not for directly usurping power and control of the cities *per se*. In addition to violence from these terrorist activities which has intensified in recently, the long-standing issues of sectarianism, ethnic strike, gang wars (especially in Karachi) and insurgency in Balochistan and Waziristan have been continuing.

The Pakistani state's response to terrorism has been motivated primarily by the political alliance with the US in the aftermath of 9/11. Starting with support to the US-led war through supply routes and access to airbases, Pakistan undertook military campaigns in the FATA area bordering Afghanistan, and subsequently in many districts in KPK and Balochistan. Many of these campaigns have come at a huge cost in terms of the number of civilian and military deaths. They have achieved modest success in wresting areas from militant control even as the war continues in several parts. The longest drawn-out military campaign was in the Swat and Malakand districts in KPK in the year 2008-09.

Systematic and sub-regional analyses of the incidence and impact of conflict are few. This chapter has reviewed the chief data sources on conflict in Pakistan and has noted several limitations. Existing data sources typically rely on news media reports that are in the public domain. In addition to the inherent limitations of using news reports as a primary source of conflict event data, comparing data across sources is somewhat problematic. Some of this stems from the different focus of various agencies that compile such data, in terms of the definitions and recording methodologies employed – this automatically renders data not strictly comparable across sources. Additionally, agencies place different levels of emphasis on collating and storing location data. This chapter seeks to make a substantial contribution to the analysis of conflict even trends in a manner that emphasises a relatively less narrow definition of fatalities of conflict as well as disaggregated and sub-district estimation of incidence and intensity.

A descriptive analysis of conflict incidence and location using the SATP dataset reveals compelling findings:

1. The level and scale of violence in Pakistan increased alarmingly since 2004 and peaked in 2009. The total number of deaths from conflict appears to be reducing since 2009. These trends are especially true for terrorist violence, but also in the case of sectarian violence.
2. While various types of violence exist in Pakistan, deaths due to conflict are highest in acts of terrorism and counter-terrorism; as high as 92% of total deaths. This is true even for civilian casualties although sectarian attacks account for a much larger share of civilian deaths than total deaths.
3. About a fourth to a fifth of total deaths from violence has been that of civilians. Militants/ terrorists account for the largest share of deaths over the years. While security forces' deaths were a higher proportion of total deaths in 2006 and 2007, this seems to have gone down subsequently.
4. The spatial spread of violence shows contagion from the border districts to the interior of Pakistan. FATA and KPK have the highest incidence of violent attacks,

followed by Balochistan, and these provinces far exceed Punjab and Sindh. In the latter, violence is mainly concentrated in cities.

5. It is noteworthy that violence is often concentrated in particular districts/ sub-districts and that even within conflict-affected provinces of KPK and Balochistan there are many districts that record no or very low levels of violence. This further encourages the case for a disaggregated analysis of the impact of conflict as aggregate/ provincial narratives may tend to gloss over underlying heterogeneity.

In conclusion, a detailed micro-level analysis of violent conflict is essential for understanding its impact, across areas and over time. The mapping of exposure to violence down to the sub-district level using the SATP conflict event timeline, the key contribution of this chapter, will enable a more systematic and detailed microeconomic examination of some of these possible causal effects of conflict on household-level decisions and outcomes in the following chapters. Future research should focus on collecting and using data on conflict incidence and impact at more granular levels of analysis.

Chapter 3. Calamity, Conflict and Cash Transfers: How Violence Affects Access to Aid in Pakistan

ABSTRACT: This chapter examines how conflict affects households' access to aid programmes in the aftermath of the massive 2010 floods in Pakistan. Using IV-estimation to correct for the endogeneity of conflict exposure and access to aid, I find that conflict reduces household access to two large government-run cash transfer programmes – the Citizens Damage Compensation Programme (CDCP) and the Benazir Income Support Programme (BISP). I make a novel attempt to determine the presence of Taliban-affiliate armed groups, and find that the presence of such groups drives the negative effect of conflict on aid access. The historical weakness of formal and modern institutions, proxied by areas being part of independent princely states, rather than under direct British Rule at the time of the creation of Pakistan in 1947 also emerges as a significant mechanism explaining how conflict reduces access to state aid. The lower access to aid in conflict-affected areas translates as the complete exclusion of villages from the programmes, as well as lower rates of intra-village coverage.

3.1 Introduction

Cash transfers are often seen as valid and effective instruments to counter conflict. This is based on an understanding of conflict as partly the outcome of grievances which may compel people to voice dissatisfaction, support rebels or to resort to violence. Cash transfers or broader social protection measures are then seen as ways of redressing (often historical) grievances. This in turn is seen to make the populace more sympathetic to governments, facilitate a sharing of information and intelligence and thus increase the state's ability to crack down on rebels (Berman, Shapiro and Felter, 2009; Khanna and Zimmermann, 2014). The role of cash transfers in reducing future violent conflict can also arise from their ability to address horizontal inequalities between groups/communities which may have initially caused resentment, animosity and violent contestation. Finally, from a microeconomics perspective, increasing the returns to peaceful activities (through redistribution or otherwise) is seen to increase the opportunity costs of taking up arms (Collier and Hoffler 2004, Dube and Vargas 2007, Miguel *et al.*, 2004). Redistribution is therefore viewed as an effective means to quell violent upheaval and rebellion.

One stream of the literature examines how cash transfer programmes, service provision and redistribution can affect future political outcomes, including violent conflict. At the country level, Nielsen *et al.* (2011) find that reductions in aid receipts lead to increases in conflict in recipient countries and therefore aid can play a stabilising role in war-torn countries. In contrast, Nunn and Qian (2014) find that US food aid led to increases in the incidence and duration of civil conflict in recipient countries but had no effect on inter-state conflict. Justino (2011), in a study of a panel of Indian states, finds that social spending reduces the occurrence of riots, whereas increase in policing does not have any sustained impact on future violence. Berman, Shapiro and Felter (2009) find that increased spending through the US Commanders' Emergency Response Program (CERP)[23], when combined with increased troop strength, led to reduced violence in Iraq. In contrast, Crost and Johnston (2014) find that the KALAHI–CIDSSS programme[24] in the Philippines in fact increased civil violence. Beath, Christia and Enikolopov (2012) find that the National Solidarity Program[25] in Afghanistan was able to create a favourable attitude among beneficiaries regarding their economic wellbeing, and towards the government, but did not have any discernible impact on violence.

Another stream of literature views conflict as a mediator or source of heterogeneous impact of cash transfer programmes on household outcomes. Bozzoli and Wald (2011) examine the heterogeneous impacts of the Familias en Accion programme in Colombia across high and low conflict areas and find that the programme was significantly more successful in increasing enrolment in conflict-affected areas than in others, but children from no-conflict areas did more homework and missed fewer days at school. Mesnard

---

[23] A programme rolled out as part of the US counterinsurgency operations for urgent humanitarian relief and rehabilitation

[24] A Community-Driven Development aimed at restoring basic social services and rebuild communities after Typhoon Yolanda (Haiyan)

[25] A community-Driven Development programme that sought to foster community participation for local development and human security projects

(2009) finds that the same cash transfer programme in Colombia was able to prevent migration and encouraged people to stay in their villages. However, as the level of conflict intensified, access to the programme enabled households to migrate outside.

Both these lines of enquiry do not directly address the fundamental question of how conflict affects *access* to social protection in the first instance. In other words, while there is mixed evidence on the implications of expanding social protection on future conflict and violence as well as a nascent literature on how conflict affects programme impact (given programme rollout), we do not sufficiently understand how conflict affects the implementation of aid programmes. This may be an overlooked but critical step between a government/development agency's desire to establish writ and quell strife, and its ability to do so on the ground. From the policymaker's perspective, ignoring the economic, political and logistical challenges to providing access to aid during conflict can very quickly become the proverbial spoke in the wheel of the intended virtuous cycle of redistribution, decreasing violence, development, and lasting peace.

The challenges that conflict imposes on development and state-led activities is often recounted in anecdotal accounts such as the targeting of social service/NGO offices and staff, bombing of social and infrastructure facilities and (in Pakistan) the specific targeting of immunisation camps. Such targeting, far from being incidental, is often a calibrated measure on the part of armed groups to stem the growing presence of governments and aid agencies. Armed groups may resent efforts by the government to win over political support by instrumentalising aid to threaten their base (Gompert *et al.*, 2009). They may respond either by targeting the people who are thus swayed, for example those who serve as informants to governments (Eynde, 2011), or by opposing/stalling the aid programmes themselves, thereby reducing both the demand and the supply of state aid. In explaining their results on how social protection in fact led to an increase in violence in the Philippines, Crost and Johnston (2014) argue that armed groups have an incentive to stall such projects (through violence) precisely because they threaten the support their movement enjoys. They formalise this in a model which shows that development programmes will be targeted with violence if (a) they can potentially tilt the balance of support in favour of the government, (b) armed groups have the capability to violently attack and thus derail the programme, and (c) the government is not able to "pay off" the armed groups/rebels to allow safe rollout of the programme. A combination of these three conditions can therefore mean that expanding social protection can exacerbate strife, and instead of conclusively winning hearts and minds, widen the development gap, making future conflict more likely. While Crost and Johnston (2014) show that the programme led to a higher number of insurgent-initiated attacks during its preparation phase and interpret this as an indication of insurgents' motives to scuttle the programme, they do not specifically examine how and to what extent such motives may affect the actual receipts of aid at the household and community levels.

In Pakistan in particular, the state seeks to extend cash transfers programmes in conflict affected areas in order to reclaim legitimacy and establish its writ. This is reflected in the following text from the Planning Commission of Pakistan's Report of Economists outlining the Medium Term Development Framework:

> Conflict in NWFP [old acronym of the Khyber Pakhtunkhwa province], FATA and Balochistan has severely challenged the ability of the state as well as the legitimacy of the idea of a functioning state in Pakistan. Social protection must be part of the strategy to reclaim the space and legitimacy for the state in Pakistan, through protection to the basic entitlements of people in the conflict-affected areas.
>
> … Expanded social protection programmes, particularly directed at the conflict-affected areas are essential to protect innocent victims of conflict, and to regain legitimacy for the idea of a functioning state through creating, expanding and ensuring the delivery of citizenship-based entitlements.

- GoP (2010), pp. 145

However there is no evidence on whether (or how) the government's ability to implement and extend such programmes is itself compromised by conflict.

This chapter examines how violent conflict[26] affected households' access to aid programmes in the aftermath of the 2010 floods in Pakistan; a time of heightened suffering and vulnerability when the need for social protection and relief was most acute. Specifically, I separately examine the effect of conflict on access to two programmes: the Citizens Damage Compensation Programme (CDCP)[27] – Phase I, and the Benazir Income Support Programme (BISP).[28] The dataset used for analysis is representative of all flood-affected areas – the universe for the CDCP. The BISP however has a wider (nationwide) intended coverage – for which the current dataset is not representative. The BISP is included in the analysis to indicate the extent to which access to such regular social protection programmes is affected by conflict, in a time of hardship precipitated by floods. The results on the effect of conflict on access to these cash transfers in the present analysis will therefore be representative, for the programmes as a whole, only for the CDCP, and not for the BISP. However, since I estimate and present the causal effect of conflict on these programmes separately (and not together/ combined), I ensure that the inferences drawn from the results will not be driven by the unsuitability of the sample for the intended analysis.

Access to social protection is determined by demand and supply factors, and both of these can be affected by conflict. The demand for social protection receipts at the household level would typically depend upon the need for such programmes, as well as the ability of households to obtain information on such programmes, mobilise, comply with administrative requirements for accessing state transfers, undertake any travel and produce documents to establish eligibility, and to collect disbursements. These factors are largely unobservable but highly likely to be correlated with household demographics, education and wealth levels, and in the case of the need for aid, with the extent of flooding damages. On the supply side, the provision of social protection transfers will depend on community-level characteristics such as the presence and strength of state institutions, infrastructure necessary to rollout payments and the

[26] Measured as the natural log of (1 + n), where n is the number of people killed in conflict in the tehsil over 2001 – 2010
[27] An unconditional flood damage compensation paid in cash to flood-affected households
[28] An unconditional cash transfer paid to women recipients in the poorest households

availability of administrative staff. In section 3.3 I describe in detail how I measure and control for the effect of the demand and supply-side enablers of access to social provision to ensure that the estimated causal effect of conflict on social transfer access is not conflated with them.

I use the community-level distance to the Afghanistan-Pakistan border, a strong correlate of exposure to violence in Pakistan following the US-led War on Terror in Afghanistan and its subsequent repercussions on Pakistan, as an instrument for exposure to violence over 2001-10, and control for a wide range of confounding factors that can potentially violate the exclusion restriction. I find that conflict reduced household access to the two large government-run aid programmes. These results are robust to the inclusion of a wide range of controls, a discrete measure of the endogenous conflict variable, and the use of an alternate Instrumental Variable. At the community level, the negative effect of conflict on access to the cash transfer programmes manifests as the complete exclusion of villages from the programmes, as well as lower average rates of within-village coverage.

I distinguish between violent activity and rebel control and make a novel attempt to determine the presence of Taliban-affiliate armed groups. I treat Taliban presence and control as an unobserved, omitted variable that lowers the community-level girls' primary school enrolment rates.[29] I then use the residuals of the community-level estimation of female primary enrolment rates based on a wide array of demand and supply-side determinants of girls' schooling to proxy Taliban presence and find that the presence of such groups drives the effect of conflict on aid access. The historical weakness of formal and modern institutions, indicated by areas being part of independent princely states, rather than under direct British Rule at the time of the creation of Pakistan in 1947 also emerges as a plausible mechanism explaining how conflict reduces access to state aid.

[29] Owing to the Taliban's avowed opposition to girls' schooling

Section 3.2 describes the case study setting, detailing the context of the 2010 floods and the two main cash transfer programmes analysed in this paper. Section 3.3 describes the data sources used and, along with a historical description of recent political violence in Pakistan. Section 3.4 outlines the empirical strategy. Section 3.5 presents results on the causal link between conflict and household/village level access to cash transfers, and analyses mechanisms. Section 3.6 discusses the empirical results to better understand how conflict affects aid access and targeting in Pakistan. Section 3.7 concludes with notes for policy.

3.2 Empirical Setting and Context

3.2.1 The 2010 Floods in Pakistan

Pakistan experienced the most severe flooding in its recorded history in 2010, which started during the monsoon season (June – August). This was caused by exceptionally heavy rainfall, which inundated much of the Indus river basin and also led to severe flash flooding in many areas not directly linked with major river systems. An estimated one-fifth of the total land area of Pakistan (796,095 square kilometres) spread across its four large provinces: Sindh, Balochistan, Punjab and Khyber-Pakhtunkhwa was flooded. The official death toll due to the floods was approximately 2,000. However, according to Government of Pakistan estimates, about 20 million people were affected by the floods through displacement and damages to land, property and livestock. The intensity of the flooding has had perilous consequences for life, property and the economy in Pakistan. In addition to the displacement of entire populations, there has been large scale destruction of homes and other buildings, agricultural land, livestock, power generators and also led to the outbreak of several diseases such as malaria, gastroenteritis and diarrhoea.

3.2.2 Cash Transfer Programmes in Pakistan

In order to provide relief and aid rehabilitation for victims of the massive flooding, the Government of Pakistan announced a massive cash transfer-based flood relief programme (CDCP), in two phases. Phase I comprised a payment of PKR 20,000 to each eligible household. Eligibility in Phase I was defined as (a) every household residing in a deemed "flood-affected" village/urban centre (subject to exceptions for households with a foreign bank account and having undertaken foreign travel) in Punjab, Sindh and Balochistan, (b) households identified as flood-affected based on a house-to-house damage assessment exercise conducted in Khyber-Pakhtunkhwa. Phase II comprised a larger (between PKR 20,000 – 40,000), but more delayed pay-out to a subset of the most badly affected households. In this chapter, I only examine access to the CDCP Phase I transfers (as the survey data used was collected between the rollout of Phases I and II).

Additionally, the Government of Pakistan, upon transitioning from military to democratic rule, following the assassination of former Prime Minister Benazir Bhutto and the victory of her party in the national elections of 2008 launched the Benazir Income Support Programme (BISP). This is an unconditional cash transfer programme targeted at women recipients in chronically poor households, identified using a Proxy Means Test developed in collaboration with the World Bank. The programme has an elaborate eligibility determination process, based on poverty scores calculated by a centralised database authority from a household-level poverty census conducted in 2008[30] and makes monthly payments of PKR 1,000 – 1,200 to eligible households.

The CDCP and the BISP were the two largest public cash transfer programmes in 2010-11 and are therefore the focus in this paper. Further, the CDCP – Phase I and BISP transfers differ in terms of frequency (one-off transfer v/s recurrent), monetary value (one-time value of PKR 20,000 v/s monthly payments of PKR 1,000 – 1,200), aim (disaster compensation v/s regular income support to the chronic poor) and intended beneficiary

[30] And is a departure from previous targeting mechanisms used for social protection in Pakistan that were based largely on the discretionary assessments by elected representatives (World Bank 2007, Sanchez-Paramo *et al.* 2010).

profile (flood-affected populations v/s the chronic poor). The differences can potentially affect the ways in which conflict affects cash transfer access and I therefore examine effects on both programmes, separately, to potentially allow me to identify if any specific design features of these cash transfer payments make them more or less sensitive to violent conflict.

3.2.3 Data and Methodology

For my analysis I use the baseline cross-section of the CDCP Impact Evaluation dataset (National Database and Registration Authority, Government of Pakistan). This dataset is representative of all flood-affected areas of the four major provinces of Pakistan: Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan. The dataset comprises 7802 households across 498 Primary Sampling Units (PSUs), including 448 rural, and 50 urban communities. The survey for the baseline was conducted during December 2011 – February 2012, after the rollout of the first phase of the CDCP flood relief transfer.[31] The survey comprised detailed questionnaires for male and female respondents at the household level, and a detailed community-level module.

Conflict data, covering incidents of terrorism, counter-terrorism, insurgency, sectarian violence, were collected from the South Asia Terrorism Portal, a leading conflict news media monitoring agency that conducts a detailed scan of 9 leading Pakistani newspapers and provides a summary record of conflict events. Conflict events over the period January 2001 – May 2010 (just before the onset of the 2010 floods) were coded to the lowest administrative level possible and indices of conflict exposure at the *tehsil* (sub-district) level – measured as the natural log of (1 + n, the number of people killed in conflict events) – were calculated (as described in Chapter 2).

[31] The cross section serves as a baseline for Phase II of the CDCP transfers; it, however, contains retrospective questions on the receipt of CDCP Phase I, BISP and other non-public transfers that I use for my analysis.

3.2.4 Historical background to violence in Pakistan

Pakistan has witnessed high levels of conflict at several junctures during its history. Its creation in 1947, resulting from the partition of India, was accompanied by the large-scale migration of communities, and also communal rioting and killing. In subsequent decades Pakistan witnessed several forms of intra-state political violence, driven by motivations including sectarianism (Nasr 2002), ethnic factionalism (Alavi 1988; Cohen, 2004), insurgency in East Pakistan leading to the creation of Bangladesh (Jaffrelot, 2002; Bose, 2011), in Balochistan (Grare, 2013), and gang warfare in cities, particularly Karachi (Gayer, 2007; Waseem, 2002). The most pronounced focus on violence in Pakistan, however, has been over the past decade that has seen a dramatic rise of Islamist militancy. The US-led War on Terror in Afghanistan, following the September 11, 2001 terror attacks in the US led to the movement of al-Qaeda and Taliban fighters across the porous border into Pakistan's territory (Yusuf, 2014; Gunaratna and Iqbal, 2011; Gul, 2009; Rashid, 2008,2012). The border areas of Pakistan owing to their geographical continuity with Afghanistan allowed the Taliban and al-Qaeda fighters space to hide and regroup to launch counter-attacks on US and later Pakistani forces to resist the Western occupation of Afghanistan and Pakistan's logistical and military support to this campaign (Yusuf, 2014). This resulted in counterterrorism military campaigns by the Pakistani Army (listed in Chapter 3) and the ensuing clash between terrorists and the Pakistan Army led to the largest numbers of killings due to conflict over 2001-10. Table 1 shows the fatalities due to conflict by motivation and province over January 2001 – May 2010.

Table 1. Fatalities in Conflict by Motivation of Incident and Province: Jan 2001 – May 2010

Motivation	Balochistan	KPK	FATA	Punjab	Sindh	Total	%
Counter/Terrorist	461	7,767	11,758	783	363	21,132	92.38
Communal	0	0	2	45	0	47	0.21
Sectarian	189	278	425	223	132	1,247	5.45
Insurgent	335	0	0	0	0	335	1.46
Tribal Rivalry	0	48	8	0	0	56	0.24
Ethnic	8	0	0	0	0	8	0.03
Unknown	26	2	18	4	0	50	0.22
Total	1,019	8,095	12,211	1,055	495	22,875	
% of Counter/Terrorist	45.24	95.95	96.29	74.22	73.33	92.38	

Source: Authors' calculations based on South Asia Terrorism Portal conflict timeline for Pakistan

With the exception of Balochistan (where insurgency accounts for a very high share of total deaths), terrorism/counter-terrorism operations account for the highest share of lives lost in conflict across the provinces. This emphasises the centrality of terrorist violence[32] in shaping the conflict environment in Pakistan. Finally, Fig. 1 below depicts the spatial concentration of violent conflict in Pakistan at the district level.

Fig. 1. District-wise Total fatalities per 10,000 of population due to Conflict in Pakistan: Jan 2001 – May 2010: SATP

Source: Author's calculations using SATP data

The map above depicts (a) the vast spread of violence across the territory of Pakistan, and (b) its greater concentration in areas closer to the Afghan border, towards the North-West.

[32] in large part involving the Tehrik-e-Taliban Pakistan (TTP) and its affiliate groups

3.3 Empirical Approach and Identification Strategy

I attempt to study the causal link between conflict exposure and access to cash transfers using a cross-sectional dataset. Any OLS estimates for such analysis would be biased because of the endogeneity of conflict and programme access, as unobservable factors that cause chronic poverty and enhance vulnerability to shocks (and therefore increase programme eligibility) may also be responsible for conflict. Also, factors associated with the ability of communities to demand and secure government programmes, such as social cohesion, can potentially also enable them to resist the control of armed groups, and the spread of violence. To overcome these endogeneity concerns, I use an Instrumental Variables (IV) approach to identify the causal impact of conflict on programme access. Based on an examination of the historical evolution and context of political violence in Pakistan, described in detail in Chapter 3, I find that the Distance to the infiltration routes used by the Taliban from Afghanistan is a strong correlate of violence in Pakistan. This is because areas closer to infiltration routes along the Afghanistan-Pakistan border became militant strongholds and eventually the battleground of terrorist and counter-terrorist activity. However, since it is not possible to identify the exact points of infiltration used by militants across the long and porous border, I use the nearest distance to the Afghanistan-Pakistan border as the IV for exposure to violent conflict. To compute this, I identify the community centroid from the household survey and calculate the shortest distance to the Afghanistan-Pakistan border.

I use the distance to official border crossings on the Afghanistan-Pakistan border (in fact relatively seldom used by Taliban fighters to infiltrate into Pakistan compared to the numerous unofficial border crossings) and the community-level share of Pashto speakers (proxied by the language of the household interview) as the measure of Pashtun population, a factor that facilitated the entry and regrouping of the Taliban from Afghanistan into Pakistan, as IVs for conflict exposure as robustness tests. I find that my main results are robust to these two IVs (Appendices 3.1 and 3.2, respectively).

In estimating the impact of conflict on aid receipt at the household, the causal relationship of interest is given by Equation (1) below:

$$Y_{ij} \quad = \alpha \quad + \beta_1 X_{ij} + \beta_2 CON_{ij} \ + \beta_3 P_k + \varepsilon_{ij} \qquad \dots (1)$$

Where

Y_{ij} is the likelihood of household i in Primary Sampling Unit (PSU), or community j receiving the aid programme.

X is the matrix of household /community-level control variables.

P represents the matrix of k Province dummies.

CON is the measure of conflict exposure at the sub-district level, and is assumed to be the same for all households/communities in the sub-district.

Owing to the endogeneity of *CON* with Y_{ij}, the coefficient β_2 in Equation (1) is biased. I therefore estimate an IV probit model, represented by the following two-stage equations (2 and 3).

First stage Equation:

$$CON_{ij} \quad = \alpha \quad + \gamma_1 X_{ij} + \gamma_2 DISTANCE_j + \gamma_3 P_k + u_{ij} \qquad \dots (2)$$

Where DISTANCE represents the distance between community j and the international border with Afghanistan.

The second stage equation is given by (3) below, where β_2' now reflects the causal effect of CON on Y_{ij}.

$$Y_{ij} \quad = \alpha \quad + \beta_1{}' X_{ij} + \beta_2{}' \widehat{CON}_{ij} + \beta_3{}' P_k + \ \varepsilon'_{ij} \qquad \dots (3)$$

I now discuss the potential threats to the exclusion restriction for my IV (Nearest distance to the Afghanistan-Pakistan border) as well as the measures I take to mitigate any threats to causal identification.

IV Estimation: Justification, Potential Threats and Mitigation

3.4.1 Justification

Over the 2001-10 period in Pakistan (over which I measure conflict), as Table 1 showed, more than 92% of deaths due to conflict were in terrorism and counterterrorism operations involving militants - from and sympathetic to the regrouping Taliban from Afghanistan. The regrouping Taliban were stronger in areas closer to the border and proximity to the border would come to imply a greater extent of Taliban operation and therefore greater retaliation from the Pakistan Army over the 2000s. As such, proximity to the Afghanistan-Pakistan border is a strong correlate of violent conflict involving Islamist militant groups associated with the TTP between 2000 and 2010.[33] As this form of violence accounts for the overwhelming share of deaths in conflict during this period in Pakistan, the distance to Afghanistan is therefore also a strong statistical correlate of violent conflict in Pakistan as a whole. Further, the locally-driven forms of conflict in Pakistan over this period, including the Baloch insurgency and sectarian attacks by groups such as the Sipah-e-Sahaba/Laskhkar-e-Jhangvi, together account for less than 10% of deaths in conflict and bear no spatial association with the Afghanistan-Pakistan border.

3.4.2 Threats to the Exclusion Restriction and Mitigation

The community-level distance to the Afghan border can, in addition to predicting the onset and intensity of violence, also be correlated with several variables that directly determine programme access and coverage. Unaddressed, this can pose threats to the validity of the instrument and bias the causal estimate of violence on programme access. I identify a multitude of possible factors correlated with distance to the border with

[33] So too with the community-level share of the Pashtun population, a correlate of likely Taliban presence, operation and confrontation in Pakistan over 2001-10, and hence also used as an additional IV for robustness.

Afghanistan that also determine programme eligibility access, and control for potentially confounding factors that affect the supply and demand for cash transfers. The assumption is that after controlling for the factors listed below, the distance to Afghanistan does not predict cash transfer receipts, except through violent conflict.

The following controls are necessary not only for ensuring that the IV is valid, but also to estimate the effect of conflict on access to cash transfers over and above the effect of factors that directly affect the supply and demand of cash transfers. Among the sets of controls identified and explained below, 3.4.2a and b (accessibility and institutional factors, respectively) pertain to the supply of cash transfer programmes, while 3.4.2c (household characteristics) comprises the enablers of household-level demand for cash transfer receipts.

3.4.2a Potential Accessibility Confounders

Remoteness: Pakistan's border with Afghanistan forms the North-Western boundary of the country. Greater proximity to an international border also reflects a greater and considerable distance from the hinterland[34] and in the case of a country as large as Pakistan this magnitude can be considerable. Areas close to the Afghan border are generally remote, and therefore harder for bureaucrats and aid workers to reach. The disbursal of aid is made from the central government to the provinces (province capitals), then from province capitals to district headquarters, and finally from district headquarters to villages/cities. In order to ensure that the distance to Afghanistan does not simply reflect communities' remoteness from centres of aid disbursal, I include, as controls, (a) province dummies to capture a wide range of unobservable and province-wide characteristics, including remoteness from the national capital and location vis-à-vis Afghanistan; (b) the shortest distance to the provincial capital, and finally (c) the shortest distance to the district headquarters.

[34] Speaking directly to Ahmed's exposition on the tensions between the core and the periphery in modern Islamic countries, including Pakistan (Ahmed, 2013)

Geography: In addition to remoteness, the terrain and topography, arguably associated with distance to Afghanistan, also affects the ease with which aid administrators can reach communities. I include community level controls for topography. While about 85% of all communities in the sample are inland plains alone, I control for each the following types of topography through dummy variables: inland plains, coastal plains, plateaus, hills, valleys, mountainous areas, deserts and "other" topography.

Army Proximity: In Pakistan, the role of the armed forces can be critical for many governance activities, including aid disbursement. This may be because of two reasons. First, having been directly under military rule for a large part of its history, the Pakistani armed forces are deeply entrenched in several spheres of public life and areas closer to their bases may be better served by public goods and services (Siddiqa, 2007). Secondly, and pertaining more to the case of the CDCP transfers, in the aftermath of massive flooding there were several logistical challenges in reaching flood-hit communities which were overcome only with the Army's technological and human resources. However, this potentially enabling role that the armed forces can play in ensuring access to aid can be less effective in areas further away from the bases of the armed forces, particularly the Army. In order to ensure that the IV is not confounded with the ease of access by the Pakistan Army, I calculate and control for the distance between the community and the nearest armed forces' cantonment.

3.4.2b Potential Institutional Confounders

Infrastructure: Areas closer to the Afghan border such as the FATA have low levels of public infrastructure at the community level. Although poor community-level infrastructure is found across several parts of Pakistan, beyond the North-West, including Balochistan, inner Sindh and parts of southern Punjab, it is imperative that the measure of proximity to Afghanistan does not proxy a lack of infrastructure. Infrastructure, such as road connectivity, transport access, the presence and functioning of markets, and connection to telephone and electricity lines is directly required for the rollout of the two cash transfer programmes under consideration. I therefore control for community-level infrastructure by developing a count variable-based additive index of various types of physical infrastructure facilities, as suggested by Case *et al.* (2004). These include dummy variables for whether or not the community has a bus/wagon stop, railway station, shop, wholesale market, bank, flour mill, tractor rental centre, fertiliser depot, motor-able approach road, and electricity, gas and drainage connectivity.

State Presence: Areas with lower state presence, in terms of state-run institutions and public services are less able to rollout state aid programmes. This may be because of the lack/weaknesses of existing administrative economies of scale that create a need to establish new systems, rather than piggy-back on existing ones. In such areas there is additional need for local bureaucrats and administrators to familiarise populations with bureaucratic procedures, provide necessary paperwork, develop effective ways to relay messages and roll out aid, and gain community trust. In areas that have a low interface with state-run bodies, these challenges can be onerous and can reduce the reach of state aid programmes, as well as reduce local citizens' demand for state services. I therefore measure and control for state presence using an additive index of government bodies at the community level. Specifically, this includes government schools, health facilities, state-run immunisation camps, presence of community health workers, post offices and Union Council, Tehsil and District-level administrative headquarters.

Ethno-linguistic Fractionalisation: Greater linguistic fractionalisation within communities, reflecting deeper cleavages between groups can make access to aid more difficult (Alesina *et al.*, 1999). This may be because deeper social cleavages involve higher transactions costs for communication between groups and entail a reduced ability to impose penalties for a failure to cooperate (Fearon and Laitin, 1996; Miguel and Gugerty, 2005). This may also prevent effective local coordination for pressuring government agencies to deliver aid. In a situation of conflict (which may itself be more likely to arise in more deeply divided communities), such between-group differences may result in lower local coordination and a lower demand for/pressure to ensure access to aid. Based on data on the language in which the survey interview was conducted and given that the survey fieldwork teams were proficient in the use of Pakistan's major languages (including Urdu, Sindhi, Punjabi, Balochi, Pushto, Brahvi, Saraiki, Hindko and a few other languages[35]) to conduct interviews, the language of interview can be a good proxy of the respondent household's linguistic identity. I use this information to calculate an index of Linguistic Fractionalisation at the community (Primary Sampling Unit – PSU) level, according to the formula[36] developed by Alesina *et al.* (2003) to ensure that, if associated with the distance to Afghanistan, linguistic fractionalisation does not drive the IV results.[37]

3.4.2c Cash Transfer Demand Confounders

In order to ensure that the instrumental variable does not pick up the effect of factors (which may be associated with the distance to the Afghanistan-Pakistan border) that increase households' eligibility for and access to cash transfers I also control for key factors that determine either eligibility for the programmes (flood exposure index for CDCP and correlates of chronic poverty for the BISP – including land ownership, wealth, sex of household head), as well as factors that enable households to demand and access cash transfers in Pakistan (number of adult males in the household, adult education, household size). Eligibility/ need and ability to access comprise two dimensions of household demand for cash transfers.

3.5 Results

3.5.1 Descriptive Statistics

Table 2 below shows the coverage of both cash transfer programmes for the full sample as well as for the following sub-groups: no-conflict areas, Low/Medium/High[38] conflict

---

[35] Which ensures that the language of the interview was not constrained/affected by the survey teams' knowledge of languages

[36] This is defined as "One minus the Herfindahl Index of Ethnolinguistic group shares", and indicates the "probability that two randomly selected individuals from a population belonged to different groups" (Alesina *et al.*, 2003)

[37] Ethnicity, though often correlated with linguistic identity in Pakistan is not explicitly available for the respondent households

[38] classified based on terciles of communities by the value of log (1+n) of the number of people killed in conflict in the sub-district

areas, and all conflict-affected areas combined. While 61.34% of the sample received the CDCP – Phase I transfer, 15.44% received the BISP. The coverage of both programmes is lower in conflict-affected areas as a whole, compared to peaceful areas.

Table 2. Coverage of CDCP – I and BISP: Full sample and sub-groups based on Conflict Exposure

		CDCP – Phase I		BISP	
	Total No. of HHs	**No. of HHs Receiving CDCP – I transfers**	**Share of HHs Receiving CDCP – I transfers (%)**	**No. of HHs Receiving BISP transfers**	**Share of HHs Receiving BISP transfers (%)**
No conflict	4736	2963	62.56	869	18.35
Low conflict	1,256	751	59.79	104	8.28
Med conflict	817	585	71.60	93	11.38
High conflict	993	487	49.04	139	14.00
All conflict-affected areas	3,066	1,823	59.46	336	10.96
Total	7,802	4786	61.34	1,205	15.44

The difference in coverage rates (share of households receiving the transfer) of the CDCP – I between no-conflict and conflict-affected areas is of 2.75 percentage points, while that for the BISP is 8.87 percentage points. Simple t-tests shows that these differences are significant at $p < 0.001$, indicating that the coverage of both programmes is significantly lower in conflict-affected, viz. peaceful areas.

3.5.2 IV First Stage Results

Table 3 below show the IV first-stage results for the instrumentation of conflict (log [1+n] deaths due to conflict between 2001-2010) with the distance to the Afghan border.

Table 3. Conflict and the Nearest Distance to the Afghan Border: IV First-Stage Results

	(1)^	(2)^	(3)^
Distance to Afghan Border	-0.877***	-0.341***	-0.269***
	(-63.01)	(-14.56)	(-12.11)
N	7802	7802	7767
Province dummies	No	Yes	Yes
Controls	No	No	Yes
Partial F-statistic	160.93	29.71	14.58
Prob. > F	0.0000	0.0000	0.0002
Adjusted R-squared	0.3373	0.4731	0.5673

t statistics in parentheses

^Standard errors are clustered at the PSU (community) level[39]
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Community-level controls: urban/rural dummy, community-level flood exposure index, distance to province/district capitals and army cantonments, indices of community-level infrastructure, state presence and linguistic fractionalisation, topography dummies.
Household level controls: household size, number of males, number of members aged 14 and above, female-headed household dummy, no of males and females with primary and secondary schooling, value of livestock owned (pre-flood), acres of farm land owned, dummies for land ownership categories and owning non-agricultural enterprises.

As we see in Table 3 above, as expected, conflict has a significant and strong negative association with the distance to the Afghan border. Further the values of the F-statistic are sufficiently high to indicate a strong instrument as per Stock and Yogo (2005). This is robust to the inclusion of controls and province dummies.

3.5.3 Causal effects of Conflict on Access to Aid Programmes

Tables 4 and 5 below show the estimates of the marginal effects of the level of violence at the sub-district level (measured as the log of (1+n) killings due to political violence in the sub-district over 2001-2010[40]) on the likelihood of receiving CDCP Phase I and BISP transfers, respectively. I first present simple probit estimates, followed by the IV probit (second stage) estimates to address endogeneity concerns.

Table 4. Access to CDCP - I: Probit and IV Probit Estimates – Marginal Effects

	Probit			IV Probit		
	(1)	(2)	(3)	(4)	(5)	(6)
Log (n+1) killings at tehsil level	-0.019***	-0.000	0.007	-0.237***	-0.455***	-0.512***
	(-3.14)	(-0.01)	(0.83)	(-7.75)	(-4.30)	(-3.60)
Province Dummies	No	Yes	Yes	No	Yes	Yes
Controls	No	No	Yes	No	No	Yes
N	7802	7802	7767	7802	7802	7767

[39] Although I measure conflict exposure at the tehsil level, I cluster standard errors at the PSU level because of the relatively lower number of tehsils in the sample (92, as against 498 PSUs), and because the intra-cluster correlation of CDCP – I is higher in PSUs (0.26) than in tehsils (0.20). For BISP the intra-cluster correlation in PSUs is 0.12, and in tehsils it is 0.08.
[40] I also repeat this and subsequent analysis of the causal effect of conflict on access to aid using a discrete measure of conflict; i.e. a dummy to identify sub-districts with any deaths due to violence over the 2001-2010 period as per the SATP conflict events timeline. These results are presented in Appendix 3.

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the PSU (community) level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Community-level controls: urban/rural dummy, community-level flood exposure index, distance to province/district capitals and army cantonments, indices of community-level infrastructure, state presence and linguistic fractionalisation, topography dummies.
Household level controls: household size, number of males, number of members aged 14 and above, female-headed household dummy, no of males and females with primary and secondary schooling, value of livestock owned (pre-flood), acres of farm land owned, dummies for land ownership categories and owning non-agricultural enterprises.

Table 5. Access to BISP: Probit and IV Probit Estimates – Marginal Effects

	Probit			IV Probit		
	(1)	(2)	(3)	(4)	(5)	(6)
Log (n+1) killings at tehsil level	-0.011***	0.003	0.001	-0.205***	-0.261***	-0.444***
	(-2.98)	(0.67)	(0.29)	(-7.36)	(-2.67)	(-3.54)
Province Dummies	No	Yes	Yes	No	Yes	Yes
Controls	No	No	Yes	No	No	Yes
N	7802	7802	7767	7802	7802	7767

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the PSU (community) level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Community-level controls: urban/rural dummy, community-level flood exposure index, distance to province/district capitals and army cantonments, indices of community-level infrastructure, state presence and linguistic fractionalisation, topography dummies.
Household level controls: household size, number of males, number of members aged 14 and above, female-headed household dummy, no of males and females with primary and secondary schooling, value of livestock owned (pre-flood), acres of farm land owned, dummies for land ownership categories and owning non-agricultural enterprises.

The IV probit estimates in Tables 4 and 5 above clearly indicate a negative effect of conflict on the likelihood of receiving both CDCP Phase I and BISP transfers.[41] The mean value of killings per tehsil in the sample is 30.96. The coefficient -0.512 in table 4 means that a 10% increase in the number of killings in the tehsil (from 30 to 33, for instance), would cause a [ln(1.1)*0.512] 4.9% reduction in the likelihood of receiving CDCP – Phase I transfers. Similarly, the IV coefficient of log(1+n) killings in Table 5 of -0.444 means that

[41] The simple probit estimates do not indicate any clear effect on the whole, due to potential endogeneity.

an increase in the number of killings at the tehsil level by 10% would decrease the likelihood of receiving BISP transfers by [ln(1.1)*0.444] 4.2%.[42]

3.5.4 Mechanisms

3.5.4.1 Mechanism 1: Historical Presence of Modern and Formal Institutions

The long standing presence of formal and modern institutions such as formalised land-tenure systems, modern education, (relatively more) formalised property rights, surplus and export-generating market orientation (often through the introduction of cash crops), and modern administrative bodies including the police, the judiciary and administrative services (ranging from public works and irrigation to horticulture) enables the administration of state aid. In several developing countries, including Pakistan, these institutions were formally introduced during the process of colonisation. Direct rule by the British Crown, rather than an indirect control through the erstwhile independent princely states of British India ensured a deeper penetration of modern institutions, which could potentially have a lasting influence even after six decades of independence (Mohmand, 2011). People living in areas with a history of direct colonial rule may also be better placed to demand more and better quality of government services, which public service providers may be more able and better disposed to provide, because of a longer history of exposure to formal administrative services. Further, the absence or relatively weaker entrenchment of such institutions in some areas make them less likely to fully integrate with other territories. Mamdani (1996) and Boone (1994) argue that indirect colonial rule in Africa (i.e. through local chieftains/rulers, and not under the British Crown) empowered local chiefs and resulted in a weaker state capacity in the postcolonial future, a phenomenon Lange (2003b) describes as "decentralised despotism". Further, as Lange (2003, a and b) and Kohli (2004) show, in areas under direct colonial rule the exposure to formal institutions of administration through colonial

[42] These findings do not seek to be a commentary on the effects of conflict on BISP as a whole because the sample is limited to flood-affected areas, whereas the BISP has wider and national intended reach. The results are included to indicate the extent to which access to regular social protection programmes such as BISP is affected by conflict, in a time of hardship precipitated by floods.

rule created the conditions for post-colonial state-led development, including the provision of public goods. On the other hand, as the establishment of these institutions in the historical setting was essentially to serve the extractive aims of a colonial force, the state in such areas may be poorly equipped to effectively play a welfare role such as through disaster relief and other cash transfer programmes. Banerjee *et al.* (2005) and Iyer (2010) find that in the case of India, colonial rule reduced the availability of public goods such as health, education and public infrastructure, even decades after independence.

While there is reason to consider the institutional legacy of former colonial rule, it is not clear *prima facie,* which type of colonial exposure, direct (under the British Crown), or indirect (through the rule of princely states) is more conducive to the delivery of cash transfer programmes in the distant future. When the chasm between areas in terms of a political and wider institutional base (required for implementing programmes) widens because of continuing, or even increasing neglect of the historically backward areas, conflict, separatism and violence can erupt. This may further slow down the pace of an already lagging process of institutional development.

Alternatively, the former princely states of Pakistan that are currently part of Balochistan province (and account for the major part of the princely states areas in this household sample – mainly in the former princely state or Khanate of Kalat) experienced delayed and incomplete integration with Pakistan. These may also be areas where the popular sentiment of insurgency is stronger than in other parts of Balochistan. The princely states' areas in the sample are therefore also likely to have stronger active insurgency (not always manifesting in violence), and the presence of insurgent groups who may be resentful of the state, and therefore its aid programmes. In such an interpretation, the princely states in Balochistan are really a proxy for the presence, control and possibly also appeal of insurgents. To test this channel, I re-run the IV estimation presented in tables 3 and 4, and include a dummy for areas part of princely states in 1947.

Table 6. Access to Aid: Princely States Mechanism (IV Estimates)

	CDCP – I		BISP	
	(1)	(2)	(3)	(4)
Log (n+1) killings at tehsil level	-0.512***	-0.317**	-0.444***	-0.380***
	(-3.60)	(-1.96)	(-3.54)	(-3.07)
Princely states dummy		-1.098***		-0.397**
		(-4.63)		(-2.56)
N	7786	7786	7786	7786

Marginal effects; *t* statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Community and Household level controls same as in tables 3 and 4

The effect of the former princely states in Table 6 above is pronounced. The princely states dummy is a strong and significant negative determinant of access to both programmes. Further, introducing the princely states dummy considerably reduces the magnitude of the IV coefficient of violent conflict for both programmes.

3.5.4.2 Mechanism 2: Presence of Armed Non-state Groups

The presence, influence and control of armed groups is a potential channel through which conflict may limit the access to cash transfer programmes. This may be because state-run and state-branded[43] programmes may be a potent signal of the expanding reach of the government to arguably hitherto neglected areas that are likely to have welcomed the growing influence of armed non-state actors. Non-state armed actors who compete with the state for legitimacy of control over the local populations are resentful of, and therefore likely to block the coverage of state aid in areas of their control/influence.

This plausible channel is mentioned in several anecdotal accounts by commentators, journalists and aid agencies that operate in conflict-affected areas (Gul, 2010; Jones and Fair, 2011; Gunaratna and Iqbal, 2010). Specifically, the abduction of and assaults on aid

[43] Both programmes under consideration bear a strong image of the Pakistani state and political leadership in their name; the CDCP was locally known as *Watan*, meaning Nation; whereas the BISP is explicitly named after, and to honour Benazir Bhutto, the former Prime Minister and assassinated leader of the then-incumbent Pakistan People's Party

workers and local bureaucrats, as well as targeted attacks on aid missions and offices[44] reflect the real threats of implementing aid programmes in conflict-affected areas of Pakistan.

Measuring the influence of the control or relative strength and influence of armed groups is not very straightforward. This is because areas affected by violence, are often, but not always areas of rebel control (Kalyvas, 2006; Justino and Ibanez, 2014). Violence erupts where there is a live contestation; when either armed groups demonstrates a degree of temerity in attacking civilian areas, or when state forces intrude areas occupied by non-state armed groups to regain control. In several other areas where the non-state armed groups are in greater/complete control, state forces may be unwilling and unable to enter and therefore no instances of violence may be reported in these areas. While violence can be observed and reported in government and media open source outlets, there is no such available source for data on areas under effective control of armed groups.

Estimating Taliban Presence through its Effect on Girls' Schooling

As the direct observation of the areas of armed group control is almost impossible, I attempt to find a proxy measure for the degree of armed group influence in Pakistan. Several observers and aid agencies, as well as direct sources of the Tehrik-e-Taliban Pakistan have referred to the direct targeting of girls' schooling in areas of the TTP's presence (Constable 2011; Rashid 2008, 2009; Gul 2009). These groups reject the concept of modern (seen as Western and un-Islamic) education, particularly girls' schooling and have specifically attacked girls school buildings to enforce their agenda. This manifests in the direct targeting of school buildings, particularly for girls' schools, as well as other forms of threat, pressure and moral policing they are able to impose which deters girls' school attendance and enrolment. The ICG (2013) reports that before the Swat military operation in 2009 when the valley was under the effective control of the Taliban, nearly 400 of the total 1600 schools had been attacked and that about 70 percent of the schools attacked were girls' schools. According to the Global Coalition to Protect Education from

[44] Such as a targeted attack on the Turbat, Balochistan office of the BISP in August 2010. Dawn, 09 August 2010.

Attack (2014), militants carried out anywhere between 838 and 919 attacks on schools across Pakistan, between 2009 and 2012 alone.

I exploit this stylistic fact to identify the degree of control of non-state armed groups, mainly the TTP affiliates, by treating such control/influence as a latent (omitted) variable in the production function of girls' primary school enrolment. The guiding assumption for the following analysis is that after controlling for all plausible demand and supply-side factors that determine the rate of girls' enrolment in primary schooling at the community level,[45] the presence of Taliban-affiliate groups would decrease the enrolment rate.

Using data on girls' primary school enrolment and a range of household and community-level characteristics that reflect demand and supply-side determinants of girls' schooling, I estimate a model to determine girls' primary school attendance at the community level. After including a vast number of control variables, I argue that the residuals from such an extensive estimation consist essentially of (a) the influence of TTP and affiliate groups, which is an important omitted variable that determines girls' schooling, and (b) the (usual) stochastic error term. This is laid out formally below:

$$F\_ENROL_c \quad = \alpha \quad + \gamma_1 XD_c + \gamma_2 XS_c + \gamma_3 ANSA_c + e_c \qquad \ldots (4)$$

Where

F_ENROL is the rate of female primary enrolment in community C

XD is the matrix of demand side factors that determine female primary enrolment at the community level including adult male and female education, average household income/wealth indicators, community infrastructure, community ethnicity characteristics, community-level linguistic fractionalisation, displacement status of community (due to flood)

[45] Including adult female educational attainment that controls for attitudinal drivers of the gender bias in primary schooling

XS is the matrix of supply-side determinants of female enrolment including the presence of primary girls' schools in the community, access to electricity, community-level state presence

ANSA is the extent of the control of Armed Non-State Actors (more specifically the TTP groups). This is not observed in the data.

e is the random error term

As ANSA is not observed, an econometric estimation of F_ENROL will essentially determine:

$$F\_ENROL_c \quad = \alpha \quad + \gamma_1 XD_c + \gamma_2 XS_c + u_c$$

… (5)

Where u is the error term that contains the omitted ANSA variable

$$u_c \quad = \gamma_3 ANSA_c + e_c$$

… (6)

If XD and XS sufficiently control for the main determinants of female primary enrolment, the residual u_c in Equation (5) above therefore will follow the same distribution as/will reflect the (omitted) ANSA variable (as the true error, e_c is randomly distributed).

Girls' schooling in Pakistan faces several hurdles and much resistance, in no small part from conservative social attitudes against girls' schooling and mobility. Such unobservable factors could well be important determinants of girls schooling. In order to control for this, I specifically include community-level measures of adult female educational attainment to capture the effect of attitudes/biases against girls' schooling and to ensure that the residual term is not conflated with attitudinal resistance to girls schooling, and is therefore a closer approximate of the presence of the TTP groups. It is important to note that Equation 5 above is not a causal estimation of female primary enrolment rates; I recognise that the control variables may indeed be endogenous. The attempt however, is to estimate equation 5 as a type of decomposition exercise to isolate the residual u_c. This approach is inspired by macroeconomic analyses of Total Factor Productivity growth through the 'Solow residual' (Solow: 1956, 1957).

I use the residuals from Equation 5 above (u_c) to proxy the presence of the TTP[46] (results of the full estimation are presented in Appendix 3.4). As per the assumptions of the effect of armed non state actors' control on girls' primary enrolment, γ_3 should be negative, exerting, therefore an overall negative effect on u_c. In order to test for any effect of the presence of armed groups, I divide the sample into two sub-samples:

(i) where $u_c > 0$, i.e. areas with less likely presence of Taliban-affiliate groups

(ii) where $u_c < 0$, areas where armed non state groups are more likely to be present.

I then test if the effects of conflict are driven by/are stronger in sub-sample (ii) viz. sub-sample (i). In case the armed non state groups are not in fact an omitted variable in the estimation of female primary enrolment rates, the residual u_c should be a pure, unbiased error term. In such a case the value of the coefficient of IV estimate of conflict on access to aid should not be substantially different between the two sub-samples (as the division of the sample along the 0 value of a random error term is essentially, random). However, in case there is an omitted variable (i.e armed groups control is an omitted determinant of female primary enrolment), and the presence of armed groups does indeed explain at least part of the effect of conflict on access to aid, the coefficient values between the two sub-samples should vary substantially.

I now present results of the IV estimation of the effect of conflict on access to the two cash transfer programmes at the household level across the two sub-samples that are respectively less and more likely to be characterised by the control/presence of TTP-affiliate groups, based on the residuals analysis of the community-level estimates of girls' primary school enrolment rates described above. Results of the community-level regressions for the rate of girls' primary school enrolment in order to derive residuals to

[46] Henceforth TTP presence is used to refer to presence of the TTP as well as its affiliates

identify areas with the more/less likely presence of the TTP are presented in Appendix 3.5.

Table 7. CDCP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV estimates) based on Primary Female Enrolment Residuals

	Full Sample	Residuals of Female Primary Enrollment Estimation	
		Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.512***	-0.064	-0.760***
	(-3.60)	(-0.27)	(-6.03)
N	7767	3313	3552

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Community and Household level controls same as in table 3

Table 7 above clearly shows that the negative effect of conflict on the receipt of CDCP is driven by the sub-sample that is more likely to contain communities where Taliban-affiliate groups are present. In this sub-sample, the coefficient of conflict is statistically significant and larger in magnitude than for the full sample. While the IV estimate of conflict is still negative in the sub-sample with lower likelihood of the presence of the TTP, it is of smaller magnitude and is not statistically significant. Such a sharp divergence in coefficient values and significance between the two sub-samples provides some support for the hypothesis that TTP presence limits access to aid. While overall a 10% increase in the number of killings at the sub-district level reduced the likelihood of a household receiving CDCP – I transfers by 4.9%. According to table 7, this effect is as strong as 7.2% in areas with the more likely presence of the Taliban, and only 0.01% in areas with less likely Taliban presence. I now examine similar effects for the BISP.

Table 8. BISP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV Estimates) based on Primary Female Enrolment Residuals

	Full Sample	Residuals of Female Primary Enrollment Estimation	
		Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.444***	-0.398***	-0.628***
	(-3.54)	(-2.72)	(-3.07)
N	7767	3313	3552

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Community and Household level controls same as in table 3b

In Table 8 above the magnitude of the effect of conflict is stronger in the sub-sample with the more likely presence of the TTP. In the division of sub-samples based on the residuals of the female primary enrolment estimation, in the areas with less likely TTP control, conflict also has a negative and significant effect of the likelihood of receiving BISP. Yet, this magnitude is smaller than in the sub-sample with more likely TTP control. For the full sample, a 10% increase in the number of killings at the sub-district level reduced the likelihood of household BISP receipt by 4.2%. According to Table 8, this effect is 6% in areas with the more likely presence of the Taliban, and 3.8% in areas with less likely Taliban presence. This indicates that the presence of the TTP is at least a partial explanation for how conflict reduces access to BISP.

The above analysis links the presence of non-state armed groups with access to aid by making use of one feature of the Taliban worldview: their avowed opposition to girls' schooling. Table 1 showed that the overwhelmingly large part of political violence in Pakistan over the 2000s was in fact due to terror and counter-terror operations that in large part involved the TTP. However the presence of other (i.e non-TTP) non-state armed groups, in particular insurgents is significant in Balochistan. Their presence is not captured in the analysis above (Tables 7 and 8) as they do not share the TTP's doctrinaire opposition to girls schooling.[47] The analysis therefore specifically examines the

[47] Baloch society in general is marked by the presence and persistence of strong structural and attitudinal barriers to girls' schooling and empowerment; opposing girls' schooling as a tactics of asserting control in the TTP fashion, however, is not on the Baloch insurgents' agenda

presence/control of the TTP and affiliates as a mechanism for the effect of conflict. In order to ensure that the results above are not contaminated by areas where violence is motivated by the Baloch insurgency, I present estimates from the analysis done after excluding the Balochistan province. I would ideally have liked to exclude only the instances of insurgent violence in Balochistan (and retaining TTP-linked violence, which is present in much of northern Balochistan), but owing to difficulties in identifying the motive in several acts of violence based on the SATP conflict events timeline, I examine the effects of armed group presence by excluding Balochistan altogether.

Table 9. CDCP - I Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV estimates) based on Primary Female Enrolment Residuals: Excluding Balochistan

	Full Sample	Residuals of Female Primary Enrollment Estimation	
		Taliban likely not present	Taliban likely present
Log (1+n) killings	0.110	0.322**	-0.340
	(0.89)	(2.06)	(-1.64)
N	6246	2741	2872

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01
Community and Household level controls same as in tables 3 and 4

Table 10. BISP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV estimates) based on Primary Female Enrolment Residuals: Excluding Balochistan

	Full Sample	Residuals of Female Primary Enrollment Estimation	
		Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.201**	-0.201	-0.333*
	(-2.05)	(-1.61)	(-1.67)
N	6246	2741	2872

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01
Community and Household level controls same as in tables 3 and 4

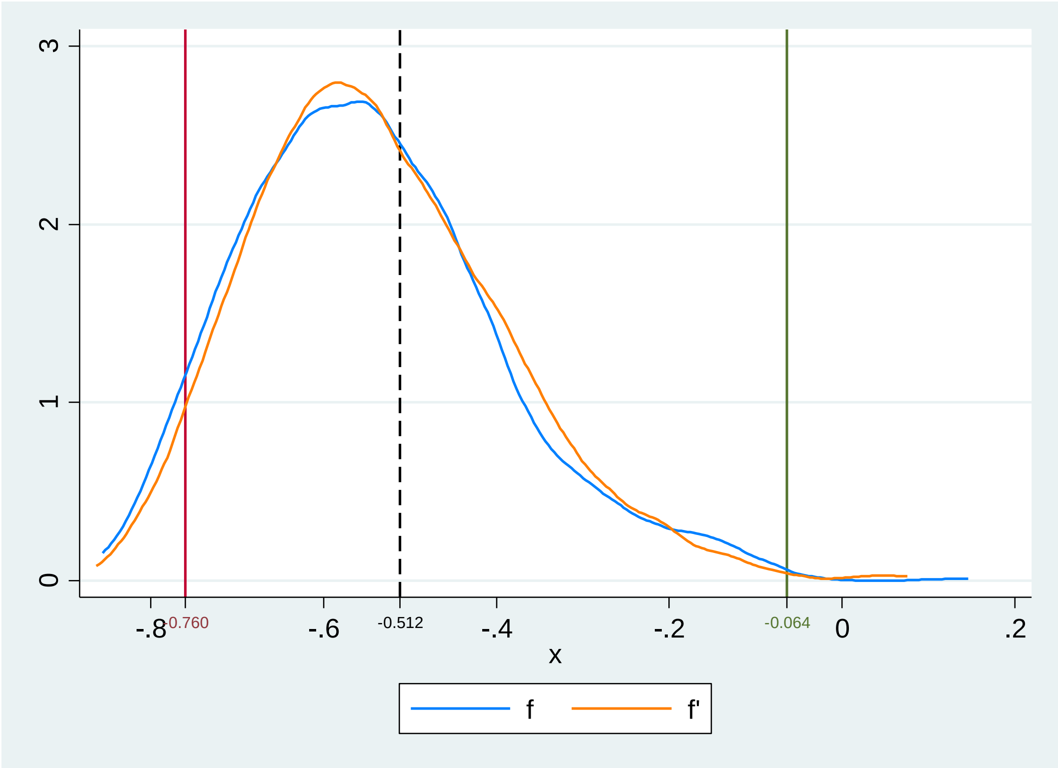
The main results in tables 7 and 8 are also visible after excluding Balochistan (even though the statistical significance is reduced, possibly because of the reduced sample size). Based on the residuals from the community-level estimation of girls' primary schooling rates, we see that in areas with the less likely presence of the TTP outside

Balochistan, conflict in fact increases the likelihood of receiving transfers, while it has the opposite effect in areas with the higher likelihood of TTP presence. This is significant as it suggests a more aggressive rollout and/or uptake of flood relief transfers in conflict-affected areas where the security threat from TTP presence is lower, alluding to the government's aim to use transfers to win support in conflict-affected areas, combined with the effective ability to do so when not faced with threats from the TTP. In contrast, in areas with the higher likelihood of TTP presence conflict has a more pronounced negative effect on flood relief receipts. In the case of the BISP as in Table 8, it appears that the negative effect of conflict on BISP is stronger in areas with the more likely presence of the TTP.

Varying coefficients in sub-samples: Chance division or likely link with Taliban-presence?

I critically examine the likelihood of obtaining sub-samples that yield coefficients of such varying magnitudes as are visible in Tables 7 – 10. In order to establish that the strong differences in the IV probit coefficients in the sub-samples with more and less likely presence of the Taliban are not driven by a 'chance' division of the sample, I compare the IV probit coefficients from the sub-samples identified above (more/less likely Taliban presence) with the distribution of IV probit coefficients from a random division of communities. I draw 1000 random combinations of communities into two groups, run the IV probit estimation over both, and then plot the coefficients from the two randomly drawn sub-samples, *f* and *f′* in a graph (Fig. 3 below). I also mark the IV probit coefficients from my initial estimation for the entire sample (-0.512), and the sub-samples with less (-0.064) and more (-0.760) likely presence of the TTP.

Fig. 3 IV probit estimates of the effect of conflict on likelihood of receiving CDCP-I transfers from 1000 random divisions of communities



As is to be expected, the distributions of coefficients from the two randomly-assigned sub-samples (*f* and *f′*) are normally distributed around the coefficient from the full sample (-0.512). As the coefficients are from randomly drawn sub-samples *f* and *f′* also overlap quite closely. It is significant that the coefficients from the specific cut of the sample that I argue demarcates more/less likely Taliban presence lie towards the far left and right ends of the distributions *f* and *f′*. In fact, I find that only 4.8% of the sub-samples pertaining to *f* and 4% of the sub-samples pertaining to *f′* have coefficient values equal to or lower than my estimate of the sub-sample with more likely presence of the Taliban. Similarly, 0.2% of the sub-samples pertaining to *f* and 0.3% of those pertaining to *f′* have coefficients that are higher than my estimate from the sub-sample with more likely Taliban presence.

Finally, I find that in none of all the 1000 random divisions of the sample is the estimate from *f* lower than or equal to -0.760 and that from *f′* is greater than or equal to -0.064 (or vice versa, i.e. from *f′* and *f* respectively). This suggests that it is extremely unlikely to randomly draw combinations of sub-samples that yield such divergent estimates of the effect of conflict on the receipt of CDCP-I transfers as arise from the sub-samples in Table 7 with higher/lower likelihood of community-level Taliban presence.

Similarly, I repeat this exercise for the BISP, as well as for both programmes with the sample excluding Balochistan, using coefficients from the IV linear probability model estimations.[48] I find that for the BISP in only 10.5% of 1000 draws is the coefficients from the linear probability model estimation from *f* lower than or equal to the LPM coefficient for the sub-sample with more likely Taliban presence (-0.178) and that from *f′* is greater than or equal to -0.084, the LPM coefficient from the sub-sample with less likely Taliban presence (and 11.3% vice versa, i.e. from *f′* and *f* respectively). This further suggests the low likelihood of obtaining such a sub-sample from a random draw. I replicate this exercise for the sample after excluding Balochistan (as with Tables 9 and 10) and find that the likelihood of obtaining such divergent coefficients between the sub-samples is rather low compared to sub-samples from repeated random draws (15.9% and 12.4% for BISP in both combinations of *f* and *f′*, and in none of the combinations – of *f* and *f′* and *f′* and *f* – for CDCP - I). Full details of these workings and the distribution of IV LPM coefficients from repeated random draws are presented in Appendix 3.6.

3.5.5 Unpacking under-coverage due to conflict: The extensive and intensive margins of programme (in)accessibility

I now examine the patterns in which conflict reduces households' access to the two state aid programmes. Specifically, conflict may result in two sources of under-coverage of programmes. First, entire communities affected by conflict may be excluded from programme rollout due to security-related, institutional or other factors. In a second possible modus, conflict may reduce the community-level rate of coverage of the programmes; i.e. *ceteris paribus*, a smaller proportion of the population in conflict-

[48] While I present IV probit estimates in earlier sections of this chapter for interpretational ease, for the simulations I deploy a linear probability model because the IV probit estimation failed to converge for several of the 1000 attempted simulations. To ensure a distribution of coefficients from a truly random division of the sample into sub-samples, I generate the distribution of coefficients from a Linear probability model and compare the LPM coefficients from the specific sub-samples associated with more/less likely Taliban presence to such a distribution.

affected areas receives aid. This second effect may be because even after being able to enter/access a conflict-affected community, there may be factors related to both, security concerns and institutional quality that may limit aid workers from thoroughly reaching intended beneficiaries. Both of these (community isolation from, and limited reach of state aid) are important from the standpoint of delivering aid in a conflict-affected setting, and may require potentially very different approaches to overcome on the ground. In addition to conflict affecting the supply of aid programmes, it may also affect the demand. Some or all households in a community may, owing to security concerns, be unwilling, or unable to fulfil the necessary bureaucratic procedures or access local bureaucrats/offices. Both demand and supply side factors may therefore result in the complete isolation from, or the limited spread of aid programmes in violence-affected settings.

I now examine whether conflict (a) increases the likelihood of the complete exclusion of communities from the coverage of programmes, and/or (b) results in lower average coverage rates, even conditional on the programmes being present in the community at all. Recall here that differences in coverage are not driven by differences in eligibility for programmes, as the variables that determine programme eligibility (flood exposure and chronic poverty) were included as regressors in all the IV estimates presented so far.[49]

I conduct this analysis at the community level, as both dependant variables, a community without any sample household receiving the programme (= 1, else 0), and the average rate of coverage across the community (continuous between 0 and 1) are community-level indicators. Table 11 below shows the IV probit estimates of the determinants of the complete absence of the two programmes from the community. In the case of CDCP – I, two additional regressors, community-level flood exposure index, and the share of households that were displaced by flooding (that affected eligibility) are included. I also include a dummy variable for communities in a district classified as a

[49] To ensure that such differences are not driven by differential eligibility between conflict and non-conflict areas, I regress a series of variables that proxy eligibility for CDCP – I and BISP on conflict (using a similar IV approach as above) and suitable control variables and the measure of conflict does not significantly affect any of the indicators of programme eligibility. These results are presented in Appendix 7.

"Nation Building District" by the Planning Commission, Government of Pakistan (GoP, 2010). This refers to districts with lagging development indicators (Ibid. pp. 211), and are described as "breeding grounds of alienation and conflict."[50] Further, the report calls upon the Government of Pakistan to prioritise these districts for aid receipts. It states, "[T]hese regions should be designated as Nation-Building Regions of Pakistan, which must receive priority support in social protection programmes and policies."[51] Province dummies, the distance of the community from the province and district capital, dummies for topography and for areas being part of former princely states, the distance to the nearest armed forces cantonment, and indices of the presence of state institutions, community infrastructure and linguistic fractionalisation are also included as controls.

Table 11. IV probit estimates of the total absence of CDCP – I and BISP in the community (Marginal effects)

	CDCP - I	BISP
Log (1+n) killings - tehsil	0.188**	0.613***
	(2.16)	(3.88)
N	497	497

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

We see in Table 11 above that violence increases the likelihood of complete exclusion of villages from the programme. The effects are stronger in case of the more targeted BISP, compared to the near-universal (excluding in the Khyber Pakhtunkhwa province) CDCP Phase I transfers.

Does conflict also reduce community-level access to cash transfers at the intensive margin, i.e. the rate of community-level cash transfer coverage? In order to examine this, I use an IV Tobit model in which I model the average coverage rate of a programme in a community (simply, the share of households in the community that receives the transfer) as a continuous variable censored between 0 (indicating complete absence of the programme), and 1(full community-level coverage), as outlined in Long (1997). As the

[50] Ibid. pp. 145
[51] Ibid. pp. 145

CDCP – I is designed to be near-universal, unlike the BISP, the right-censoring of the coverage rate variable is effectively relevant only for the CDCP.

Table 12. IV Tobit estimates of the community-level rates of coverage: CDCP – I and BISP

	CDCP - I	BISP
Log (1+n) killings - tehsil	-0.256**	-0.156**
	(-2.30)	(-2.48)
N	497	497

Marginal effects; *t* statistics in parentheses
Dependent variable censored between 0 and 1
24 left-censored observations and 13 right-censored observations for CDCP – I
129 left-censored observations and 0 right-censored observations for BISP
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

As we see in Table 12 above, conflict also reduces the average coverage rates of CDCP – I and BISP at the community level. This is significant as it shows that conflict reduces programme access at both, the intensive and the extensive margins of community coverage. As mentioned earlier, these effects may operate through both demand and supply side factors affecting programme coverage.

3.5.6 Robustness Checks

I test whether the results presented in this chapter are robust to alternate specifications. First I consider two alternate Instrumental Variables for conflict, the community distance to the nearest official border crossing, and the share of Pashtun population in the community (proxied by the share of survey interviews conducted in Pushto). I present the causal estimates using these two IVs in Appendices 3.1 and 3.2 and find that the main results are robust to the choice of IV, with the same direction and level of significance of coefficients, but with slightly varying point estimates.

While this chapter measures conflict as a continuous variable, the natural log of 1 + n, the number of people killed in conflict in the *tehsil* over 2001-10, as a robustness test I use a dummy measure of conflict exposure that indicates whether or not the *tehsil* experienced any violence over the period. Results are presented in Appendix 3.3, and echo the findings presented in this chapter.

In 3.4.3.2 I determine likely Taliban presence based on residuals from the community-level estimation of female primary enrolment rates. I additionally compare these results with sub-samples of likely Taliban presence based on residuals from the community-level estimation of the gender gap in primary school enrolments (Male – Female enrolment rates). I find that the main results follow the same pattern as those based on residuals from the estimation of female primary enrolment rates.

3.6 Discussion

This chapter has shown that conflict reduces household access to the CDCP – I and BISP programmes in Pakistan. This is visible at the level of household access, as well as the more aggregate community level. The results are strongly significant and are robust to the choice of the measure of conflict (discrete v/s continuous), and to the use of alternate IVs.

While the Pakistani state seeks to concentrate social protection efforts in conflict-affected areas, the actual access to aid is shown to be reduced by exposure to conflict. This suggests, therefore, that while the intention of the state may be to reach out to people in conflict-affected areas, the ability of state programmes to reach populations, or for local populations to demand and access state aid, may fall short. This may be because of several reasons, some of which I explore in this paper.

The institutions associated with indirect colonial rule in the former princely states that are part of Pakistan reduce the access to aid, at the household level, as well as in terms of the presence of programmes in communities at all, as well as the coverage rates in communities. This is significant and holds even after controlling for the presence of state institutions as well as infrastructure at the community-level. It is also noteworthy that this feature is common to both cash transfer programmes, regardless of their beneficiary profile, degree of intended targeting, recurrence/frequency of payment and amount of financial assistance provided. The specific ways in which the legacy of princely rule entails lower access to aid are not immediately clear. There could be direct institutional effects; for instance the history of “decentralised despotism” alluded to earlier and described by Lange (2003b) may mean that a populace long used to customary institutions of patronage-based relief and assistance from local chiefs may be less able to pressure /demand access to aid programmes from the state. However, this may also reflect a hidden factor. Most of the princely states in the sample are part of the Balochistan province. These areas in Balochistan are also the areas which have not fully integrated with independent Pakistan, and where the insurgency movement enjoys greater popular support. This also means that areas in the princely states of Balochistan are likely to have a greater presence and control of insurgent groups, and regardless of the actual incidence of violence (which need not overlap exactly with areas of rebel control, as fighting takes place in contested areas), and either a resistance to allow the entry of aid programmes, on reluctance/hesitation on the part of households to access state aid in the presence of insurgents. This could operate through covert and overt threats to local bureaucrats and local populations alike. It is hard to disentangle any institutional effects associated with princely state rule from the conflation of incomplete integration with Pakistan and the presence (not always manifesting in violence) of insurgents in these areas. This requires further exploration in future research.

I also provide evidence for the effective control of TTP-linked armed groups being a plausible mechanism that explains why conflict reduces access to the two cash-transfer programmes at the household level. The effective control of militant groups is hard to observe from published sources of data, or household surveys. This chapter makes an attempt to proxy such presence based on the TTP’s relentless opposition of girls’ schooling, and their effective ability to enforce their writ in areas of their control. I find that the effect of conflict on access to aid is driven largely by areas with a greater likelihood of the presence of the TTP-affiliate groups.

The (perceived or real) threat to state officials' security, or to potential beneficiary households could well be the reason that causes conflict to reduce access to aid, and this chapter provides suggestive evidence for this thesis. This is also expressed in several news reports covering the targeting of aid programmes, both Pakistani and foreign-funded, state and private (Gul, 2010; Constable, 2011). This fact is also acknowledged by the Planning Commission, Government of Pakistan:

> **"The challenge in NWFP [North-West Frontier Province, now called Khyber Pakhtunkhwa] and FATA comes from groups that seek to impose their own vision of society on the majority. They violate democratic norms, actively and violently oppose social policy and development initiatives such as girls' schooling, immunization campaigns, and even income transfers to women. The armed activities of militants and the state's armed response has led to large-scale loss of life, displacement, and destruction of infrastructure, particularly social infrastructure. There has been massive disruption to livelihoods and economic activity."**
>
> \- (GoP 2010), pp. 145

Such targeting of aid workers and bureaucrats by militants, also confirmed in informal interviews with Pakistani bureaucrats and NGO workers about the challenges in administering programmes in conflict-affected areas, is a non-trivial factor.

3.7 Conclusion

This chapter explores the responsiveness of aid programmes to violent conflict in Pakistan and finds significant results. Aid programmes are viewed as instruments for the state to reach out to people living in conflict-affected areas, in order to both redress historical neglect which may have created conditions for conflict in the first instance, as well as to win over people's loyalties and thus attack the support base of armed groups.

It appears that in Pakistan, exposure to violence indeed reduces access to two state aid programmes, analysed separately. These results are representative for the CDCP programme, for which the household survey dataset is representative. While the dataset used is not representative of the intended coverage of BISP, the results presented for the BISP follow the same direction. This suggesting that though not valid as a commentary on the BISP as a programme on the whole (which has larger, nationwide intended coverage), for the population studied in this analysis – i.e. the flood–affected areas of Pakistan, access to regular the BISP was negatively affected by exposure to conflict.

The results indicate the salience of aid programmes in the contest for popular support between the state and armed groups, the effective capabilities of armed groups to prevent the distribution of aid, the greater (perceived) threat of households accessing state aid in the presence of non-state armed groups, and the absence of a means that allows the state to buy-off rebels to permit aid disbursement. For these reasons, such programmes are resented and resisted by armed groups, and become a bone of contention between them and the state. As a result of this tussle, households in conflict-affected areas have, after controlling for other factors, lower access to aid programmes because of violent conflict. In some cases, this manifests as the complete absence of programmes from villages/cities, indicating a sort of isolation of such communities from the redistributive role of the state. In other instances, it results in lower rates of coverage within communities, reflecting a curtailed connect between citizens and the state. The reduced access to aid because of conflict is channelled not through the absence of state institutions or physical infrastructure, but more through institutional factors. Specifically, I find that conflict may be able to exacerbate historical institutional frailties associated with indirect colonial rule through the former princely states (that joined Pakistan in 1947 or after). The likely presence of armed groups, indicative of a distinct institutional set-up, also plausibly reduces access to aid. Physical threats to aid workers and local-level bureaucrats, as also to local populations, associated with the unobservable presence and control of armed non-state groups is also an important mechanism linking conflict with lower aid receipts.

The present analysis has not engaged with whether conflict reduces access to aid through demand or supply channels. While security concerns may be operating on both, recipient households and on aid workers/bureaucrats, it is not clear which side is more directly/heavily constrained by conflict. Further exploration could potentially help identify ways in which delivery mechanisms can be altered to reduce the security threat in providing/receiving aid; for instance through the use of Information Technology. This is an important topic for future research, in Pakistan and beyond.

This chapter also calls for a closer and more critical examination of the potential of aid programmes in conflict. The somewhat simplistic assumption that aid can achieve peace and prosperity in conflict-affected settings papers over the many difficulties that, as this chapter has shown, impede the rollout of aid in areas ridden with strife. The risk of using aid as a political instrument is that it can then become a political target itself. Governments and donors must therefore be very measured in prescribing aid as a remedy to conflict.

Another message from this chapter pertains to the branding of aid. The two programmes examined here bear the strong mark of the Pakistani state and political establishment. This is understandable, particularly given that these were rolled out soon after Pakistan's most recent democratic transition under a new government determined to make its presence felt, including perhaps, by sending a political signal of the presence of a welfare state in a fraught environment. While there is no counterfactual available to examine if less nationalistic naming/packaging of such programmes would make them less susceptible to targeting by armed groups, it can be argued that a conspicuous stamp of the state is more likely to matter in violently contested political space, compared to in more peaceful areas. Policymakers must perhaps consider more carefully whether some kinds of symbolic messaging makes programmes more vulnerable, and therefore less accessible in conflict-affected areas.

Aid is not a silver bullet for buying peace. As this chapter has shown, its ability to reach intended beneficiaries is compromised by conflict, particularly in the presence of non-state armed groups. Any political, or human development aims of aid programmes, ranging from marginal income support to nation-building, therefore continue to necessitate the more conventional and structural solutions. In an excellent review of Pakistan's counterterrorism efforts, Yusuf (2014) identifies the key challenges of overcoming terrorist conflict in Pakistan to include the persistence of outdated laws, policies and jurisdictions, the absence of a coordinating counterterrorism body that can effectively integrate the currently disparate actions, insufficient improvements in the capacity of the local police and the state to track and freeze militant funding, the continuing civil-military imbalance in Pakistan's politics, and the insufficient public support and pressure for counterterrorism. All these point to the salience of deep structural factors that either give rise to conflict or allow it to fester. Combating conflict, or seeking to promote human development in areas affected by it cannot skirt these pertinent aspects of governance. Aid may be too feeble an instrument to achieve such ends without substantial governance reform and strengthening. Governance reforms can also be addressed to reducing historical weaknesses of institutions that I have shown exacerbate the effects of violent conflict on access to aid.

On the whole, conflict has a profound impact on the social protection and disaster relief landscape in Pakistan, with serious implications for access and targeting. These factors reemphasise the need for conflict-sensitive analyses to inform the rollout and assessment of aid programmes. They also underscore the insufficiency of development programme design and administration "as usual", in the distinct political and institutional settings created, and marked, by violent conflict.

Chapter 4. Informal Finance, Investment, and Insecurity: How Violent Conflict Affects Access to Remittances in Pakistan

ABSTRACT: I examine the causal effects of long-term exposure to conflict, measured at the micro level, on households' receipt of remittances. Using IV estimation to overcome the endogeneity of conflict exposure and remittance receipts, and controlling for a range of confounding factors, I find that, contrary to the literature from country-level case studies, long-term exposure to conflict reduces households' receipts of remittances. Informal modes of money transfer (as against formal banking), the likely presence of Taliban-affiliate armed groups, and more strongly, the overlap of these two factors, likely explain why conflict exposure leads to lower remittance receipts in Pakistan. This suggests that remittances are lower in conflict-affected areas in response to the higher risk and insecurity; which is confirmed by the fact that the negative effects of conflict on remittances are also stronger for groups that are more likely to use such receipts to invest, rather than for consumption.

4.1 Introduction

In recent years there has been a sharpened focus on the role and potential of remittances in spurring growth, promoting development and establishing new terms of North-South, and also South-South economic engagement. A growing global migrant worker population, estimated to surpass 250 million in 2015, is responsible for remittance flows to developing countries as high as US$ 436 billion in 2014 (World Bank, 2015a). For several countries, including Tajikistan, Kyrgyzstan and Nepal, remittance receipts are a very large part of the GDP (World Bank, 2015b) and for several others, including Pakistan, international remittance receipts far exceed inflows of foreign exchange from other sources, namely Overseas Development Assistance (ODA), and Foreign Direct Investment (FDI; source: Ahmed and Zorzoso, 2013).

The discussion on the role of remittances in promoting development is particularly interesting. While even the supporters of remittances caution against viewing them as a panacea, or as a replacement for development assistance and aid programmes (Ratha, 2007; Savage and Harvey, 2007), remittances can be a very effective complement to official aid flows for development due to several reasons. Remittances flow directly from migrant workers to recipient households without incurring the heavy administrative and bureaucratic costs that state-run cash transfer programmes do.[52] Remittance receipts, unlike FDI flows, are also often counter-cyclical; they tend to increase in times of economic crisis, and thus help retain foreign exchange reserves to secure financial stability at the macroeconomic level. At the household level, remittances can respond to idiosyncratic or covariate shocks, including financial, humanitarian and political crises; affected households often draw on greater outside assistance when the local means of livelihood and survival are hit. Further, remittances are used by households not only for financing consumption requirements, but also for investment purposes. Such investments from external receipts into the local economy can improve productivity, and accelerate economic activity, beyond its multiplier effects on the local economy from increases in consumption demand financed by remittance receipts (Ahmed, 2000; Lindley, 2007; Maimbo, 2006).

Violent conflict can create a set of conditions which may simultaneously accentuate the need for remittances and encumber its reach. Existing studies on remittances in conflict-affected countries have focused on national data and have found that the onset of conflict is accompanied by higher receipts of remittances in countries such as Somalia, Sri Lanka and Nepal. Some studies have also found that conflict does indeed help households weather economic hardship in conflict-affected areas, by extending a 'lifeline' to those in dire need and preventing them from adopting costly coping strategies. Yet, the context of a protracted conflict can lead to heightened risk of investments in the area, as well as raise concerns of short-term, or even longer-term security of life and property. These factors may dampen investment-focused remittances and also lead many remitters to reconsider their longer-term economic interest in conflict-affected communities. Armed

[52] even as the costs of transferring and receiving money may be significant to households

groups may pose direct or indirect threats to movements of money into areas under their control, through loot or taxation. This is likely to be higher when remittances pass through informal conduits that can be intercepted, rather than the formal banking system in which money transfers are less conspicuous. Violent conflict can also create logistical difficulties as border closures, destruction of infrastructure and the loss of documentation/IDs resulting from conflict can make it harder for households to access remittances. Owing to these factors, conflict may in fact reduce household access to remittances, even as it accentuates economic hardship and the need for remittances in the first place.

Perhaps encouraged by findings from country-level studies focusing on altruistically motivated international remittances, policymakers often call for increasing the potential of remittances in conflict-affected countries such as Pakistan, by leveraging them for investment (World Bank, 2014; IGC, 2015). Such enthusiasm is not sufficiently informed by evidence on whether or how conflict may worsen the investment climate at the micro level, and therefore deter remittances.

The relationship between conflict and remittances is not direct or simple, and can potentially vary across a range of household and community-level characteristics. Current analysis has not specifically explored how the local level exposure to violent conflict *causes* differences in remittance receipts, and how these may vary across households and groups. This chapter specifically examines:

(i) Does exposure to violent conflict affect household-level remittance receipts?

(ii) What mechanisms explain such links?

I situate the above questions in the context of the massive 2010 floods in Pakistan that hit both, conflict-affected and non-conflict areas. This is a unique and valuable setting to study these questions, as several areas of Pakistan that were flooded in 2010 had also been exposed to growing and varying degrees of violent conflict over the preceding decade, and because the post-flood context means that household distress and the need for external help in the form of remittances were high. I use a large household dataset representative of all the flood-affected areas of Pakistan in 2010 and develop sub-district level indices of violent conflict exposure over the 2001-2010 period. To address the endogeneity issue between conflict exposure and remittance receipts, I exploit variations in community-level distances to the Pakistan-Afghanistan border, a correlate of proximity to the Taliban's infiltration into Pakistan following the War on Terror, and thereafter of areas of militant operation and, eventually, confrontation with the Pakistani state to instrument conflict exposure (as in Chapter 3). I also control for a range of potentially confounding factors. This empirical strategy allows me to estimate the causal relationship between violent conflict and remittance receipts, and to examine mechanisms and underlying heterogeneities.

In this analysis, remittances are defined as cash and in-kind transfers received by the household from other individuals/ households residing outside their community (regardless of distance, potentially allowing transfers received from neighbouring communities to be classified as remittances) over a period of 12 months preceding the survey. I measure remittances received at the extensive (whether or not the household received any remittance) as well as intensive (monetary value of remittances received in cash and in kind, combined) margins. Unfortunately, the data used does not allow me to distinguish between domestic and foreign remittances. I find that conflict reduces the receipt of remittances, at both the extensive and intensive margins. This is partly because non state armed groups (*Tehrik-e-Taliban* Pakistan, or the TTP, and its affiliate groups) are likely able to threaten and disrupt the informal modes of money transfer. Having bank accounts, and therefore access to formal means of money transfers, insulates recipient households from the negative effects of conflict on remittances, regardless of the presence of armed groups. Further, the effects of conflict on remittances are driven by groups that are more likely to use remittance receipts to invest, rather than for consumption. The negative signal of long-term exposure to violent conflict on investments, i.e. greater business risk and uncertainty, is potentially another factor explaining why long term exposure to violent conflict reduces remittance receipts.

The rest of this chapter is organised as follows: Section 4.2 provides an overview of the literature on conflict and remittances, highlighting crucial gaps. 4.3 discusses the history of violent conflict in Pakistan in the decade before the 2010 floods, as well as the context of remittances in Pakistan, and the sources of data used. Section 4.4 outlines the Instrumental Variables estimation strategy, and discusses potential threats and the means of mitigating against them. Results are presented in Section 4.5, while 4.6 discusses the findings in relation to the existing literature and concludes with notes for policy.

4.2 Literature Review

4.2.1 Motives for Sending Remittances

Remittance flows can arise out of two distinct motives. The first is what Lucas and Stark (1985) term as altruism, i.e. transfers driven by the need to help recipient households in times of hardship. Remittances are then seen as extending a 'lifeline' of support to recipient households that often choose to diversify household income and send members to work outside in order to be able to depend on remittances from them in times of need. Savage and Harvey (2007) review several studies (IOM, 2003; Connell and Brown, 2005, Meyers, 1998) and conclude that remittance receipts are mainly spent on consumption needs such as food, clothing, and transportation and health expenses. Remittances may also be used for consumption ends that pertain to social obligations. Carling *et al.* (2012) find that among remittance-sending Pakistanis in Norway, transfers are often made for wedding expenses, religious donations and humanitarian causes.

Another motive for sending remittances is that these are seen as investments made by remitters in their areas of origin for an expected future return. Ahmed and Zorzoso (2013) term this the 'portfolio approach'. Studies across countries have found that remittances are also sent to finance investments in real estate (Ballard, 2005), enterprises (Carling *et al.*, 2012; McCormick and Wahba, 2002; Horst, 2006; Campbell and Kakusu, 2006; IOM, 2005) and in agriculture (Ballard, 2005).

4.2.2 Remittances in Financial Crises and Natural Disasters

Many studies have examined the relationship between remittances and the incidence of economic crises and natural disasters. Spatafora (2005) shows that remittance receipts increased considerably in response to financial crises in Indonesia in 1997, Ecuador in 1999 and Argentina in 2001. Similarly, studies have found that remittance receipts at the country level increased in the aftermath of natural disasters. Using a cross-country dataset, Yang (2005) finds that remittances increase following hurricane events. Yang and Choi (2005) find that remittances were able to partially offset weather shock-induced losses in the Philippines. Other studies have also found that remittances increase in response to particular natural disaster events in several countries including the Dominican Republic and Haiti (World Bank, 2006), Bangladesh (Clay and Benson, 2006; World Bank, 2006), Jamaica (Clarke and Wallston, 2004), Guatemala (Gellert, 2006) and Grenada (World Bank, 2005).

Investment-focused remittances respond to (changes in) the expected returns in the receiving country (El-Sakka and McNabb, 1999; Hysenbegasi and Pozo, 2002). Ratha (2003) finds that remittances were volatile in the Philippines, and declined in Turkey following financial crises in the late 1990s, and notes, more broadly, that investment-focused remittances tend to be more volatile than those meant for consumption.

Given that crises can increase altruistic remittance flows but decrease investment-focused remittances, the aggregate effect of crises on remittances depends on the relative strengths of the two motives for remittances: altruism and investment. In other words, the effect of crises on remittance receipts is essentially an empirical question that depends on remitters' motives for transferring money as well and how these are shaped by the characteristics of the remittance-receiving area.

4.2.3 Remittances and Conflict

A growing number of studies is taking a closer look at remittance patterns in conflict and post-conflict settings. One strand of this literature has focused on the direct link between remittances and the conflict itself; by examining how remittances can be used to finance armed group activity in general and rebel groups in particular, as well as how they can contribute to future peacebuilding efforts (Collier, 2000; Ballentine and Nitzschke, 2003; Horst, 2008; Orjuela, 2008).

Other studies come from country-level case studies that have found that remittances rise during conflict as some individuals migrate out of communities to other locations (usually abroad) and send back remittances to look after family members and relatives left behind. Seddon (2005) finds that remittances helped sustain the economy of Nepal over the long period of conflict and political upheaval in the 2000s even as local economic activity suffered. Lindley (2007) and Maimbo (2006) find micro-level evidence of the positive effects of remittances on households in Somalia; remittances that increased during conflict helped households cope better with losses and also encouraged a modicum of private sector growth, largely around the 'remittance economy', while the state collapsed. Monsutti (2006) finds that conflict-induced migration also led to the formation and operation of transnational remittance networks after the US-led War on Terror and the fall of the Taliban in Afghanistan in the early 2000s. Other studies have examined remittance receipts and uses among war refugees from Somalia (Horst, 2006; Campbell and Kakusu, 2006; Lindley, 2009; Gundel, 2002), Sri Lanka (Orjuela, 2008; Erdal and Stokke, 2009), Afghanistan (Schutte, 2004; Fagen and Bump, 2006), and Eritrea and Bosnia (Al-Ali *et al.*, 2001).

Some studies have examined how violent conflict can impede access to remittances, i.e. potential routes through which money transfers are affected by violence. Fagen and Bump (2006) identify specific problems that remittances are likely to face in conflict-affected countries: poor/weak financial institutions and investment opportunities, difficulties in implementing financial innovations and improving financial literacy, the absence of government policies that encourage migrants and support migrant rights (unlike in more stable contexts), and global scepticism and discouragement of migration from, and financial transactions with many conflict-affected countries that are also centres of illicit trade and terrorism,. Savage and Harvey (2007) find that border closures between Sudan and Libya during conflict led to decreases in all economic transactions, including remittances, in Darfur. They note, more broadly, that damages to infrastructure in banking and communications as well as decisions to close borders and block or suspend mobile phone networks can, at least in the short run, disrupt remittance flows. They also note that the absence or collapse of the banking system can lead to greater reliance on informal mechanisms of money transfer.

4.2.4 Contributions to the literature

There remain several gaps in the literature on the links between conflict and remittances. First, there is limited causal evidence on how varying degrees of conflict exposure explain within-country variation in remittance receipts. This is important because there can be considerable divergence (or non-overlap) of conflict exposure and remittance receipts at the local level, that country-level case studies may miss. A more micro-level approach, as is attempted here, can potentially identify areas where conflict levels are too high for remittances to effectively reach populations, thus enabling a fuller understanding of these links which need not be linear or straightforward.

Secondly, while some studies have identified the modes and mechanisms through which conflict may impede remittance flows (such as border closures, weaker telephone/banking connectivity), there is no causal empirical evidence linking conflict exposure with remittance receipts which is explained by the operation of such mechanisms.

Thirdly, the literature on remittances in conflict focuses on conflict as a crisis event that entails greater hardship and therefore the need for remittances. Remittances in conflict are therefore seen to arise mainly from the altruism motive. However, there is no evidence of the effect of conflict on investment-focused remittances, or on groups that are more likely to use remittances for investment rather than for consumption or basic survival. Conflict can potentially weaken institutions, impose barriers that hamper market integration, dampen economic activity, increase uncertainty about the future and thus increase the risk to business investments. In cases where more prosperous people are targeted in conflict, even building an asset base by acquiring large and conspicuous assets can increase conflict risk, and may therefore reduce investments in durable assets. Maimbo (2006) notes that remittances are effective in spurring investment and private sector growth only to the extent that there is a functioning government and basic public goods. No studies have specifically examined how conflict, which can affect both, governance and public goods provision, affects investment-focused remittances. While I do not have data on the actual use of remittances received (consumption v/s investment), I attempt to proxy this by assuming that households in higher per adult-equivalent monthly food consumption expenditure quintiles are more likely to use remittances for investment than households in lower quintiles. I then examine whether the causal effect of conflict on remittance receipts varies across these quintiles, and therefore across groups more/less likely to use remittances for investment rather than consumption.

Fourthly, academic literature has tended to focus on international remittances. While the impacts of foreign transfers on communities and countries may be larger, remittances arising from within the country can be considerable (Deshingkar, 2006; Castaldo *et al.*, 2012), and in any case, still of great importance to recipient households, many of whom may not have the means to undertake international migration. The data used for this chapter covers remittances from within the country and from abroad (but not separately, unfortunately), and therefore allows me to examine the effect of conflict on remittances, regardless of their source.

Finally, existing studies tend to view conflict among crises as yet another type of shock to households, such as natural disasters or financial crises. While certain conflict events such as the sudden outbreak of war, or terrorist activity can indeed be seen as shocks, the prevalence of violent conflict over a longer period of time indicates a changed institutional landscape rather than an anomalous, one-time event. This steady transformation calls for viewing conflict instead more as a state of nature; a setting in which household priorities, preferences, expectation and decisions (regarding investments, for example) may be very different from more peaceful areas. Savage and Harvey (2007) state (but do not sufficiently explore why, and how) that in long-running conflicts, it can be hard for remitters to continue sending money back home. People who have migrated out of areas that have been exposed to/continue to reel under conflict for long periods of time may reconsider their longer term pecuniary and non-pecuniary interest in origin areas, much more so than in peaceful and stable areas, and in response to most types of shocks. Faced with uncertain financial returns and prospects in native areas that are affected by violence and instability, migrants may choose instead to build a future in the destination area, and cut their future losses in the more insecure origin. This changed priority resulting from conflict can also affect the quantum and purpose of remittance flows. I therefore specifically examine the impact of longer-term exposure to conflict on remittances to understand how conflict affects remittances arising out of both, altruistic and investment motives.

4.3 Data Sources and Context

4.3.1 Data Sources

For my analysis I use the baseline cross-section of the CDCP Impact Evaluation dataset (OPM, 2013). This dataset is representative of all flood-affected areas of the four major provinces of Pakistan: Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan. The dataset comprises 7802 households across 498 primary sampling units, including 448 rural, and 50 urban areas. The survey for the baseline was conducted during December 2011 – February 2012. The survey comprised detailed questionnaires for male and female respondents at the household level, and a detailed community-level module. The household questionnaire contains detailed modules on demographics, asset ownership, occupation, and the receipt of transfers including remittances and state cash transfers.

As mentioned in section 4.1, in this chapter remittances are defined as cash and in-kind transfers received by the household from other individuals/ households residing outside their community (regardless of distance, potentially allowing transfers received from neighbouring communities to be classified as remittances) – both within and outside Pakistan, over a period of one year preceding the survey.

Conflict data were collected from the South Asia Terrorism Portal, a leading conflict news media monitoring agency that conducts a detailed scan of 9 leading Pakistani newspapers and provides a summary record of conflict events. Conflict events over the period January 2001 – June 2010 (just before the onset of the 2010 floods) were coded to the lowest administrative level possible, and indices of conflict exposure at the tehsil (sub-district) level were calculated (as described in Chapter 2 and used in Chapter 3).

4.3.2 Trends and Practices of Remittances in Pakistan

Remittances are a large part of the Pakistan economy. International remittances using official channels alone amounted to US$ 14 billion in the year 2012-13, accounting for 5 percent of the country's GDP and about half the value of total exports (World Bank, 2014). The Middle East, followed by North America and Europe, is the leading region from where international remittances to Pakistan originate (Ahmed and Zorzoso, 2013). The quantum of domestic remittances in Pakistan is also very high; while no official data on domestic remittances are available, Nenova *et al.* (2009) estimated these to be roughly 90 percent of the value of international remittances.

Remittances in Pakistan are meant for both consumption and investment purposes. The Household Survey on Overseas Migration and Remittances (2009) found that food consumption expenditure alone accounted for about 40 percent of remittance spending among households with at least one migrant worker in Saudi Arabia, while 28 percent was used for the purchase of real estate and agricultural implements (IGC, 2015). In contrast Gioli *et al.* (2013) found that among households in the Lower Dir and Swat[53] districts of Khyber Pakhtunkhwa province 63 percent of remittance receipts were spent on real estate, construction and business investments. Expenditure on social ceremonies accounted for 17 percent of expenditures from remittances. According to the World Bank (2014), about 72% of international remittance receipts went to rural areas.

Remittance transfers are made through both formal and informal channels. Formal channels include banks, money transfer companies, and in the case of domestic remittances, post offices. Informal channels include sending money in cash through visiting friends/relatives, hand transfers through human couriers, exchanges through money changers and travel agents, and most importantly the extensive unregulated/unsupervised *hawala*[54] system (Nenova *et al.*, 2009). The *hawala* system, present across many countries in South Asia, the Middle-East and East Africa, is based on a network of money transfer agents, or *hawaldars*, and depends on trust, between *hawaldars* across countries, as well as between *hawaldars* and remittance-receiving/sending households and individuals. Operators depend on trust and reputation for conducting 'money transfers without money movement.' They are thus able to circumvent official financial transfer channels. *Hawala* operators, through a network of sub-agents (and sub-sub-agents), have a wide and diverse reach, deep inside communities that are often out of the ambit of formal banking (see Rodima-Taylor, 2013; Afram, 2012[55] and Ballard, 2003 for a detailed review of the *hawala* system). The *hawala* system has many advantages from the perspective of remittance receiving and sending households; it is convenient, has a wide reach right to the doorstep of the recipients, many of whom may otherwise have limited ability to go out of the house to collect

[53] Where the massive Operation Black Thunderstorm ended Taliban control in 2009

[54] Also known as *Hundi*

[55] Afram (2012, p. 43) explains how the informal hawala or hundi market operates: "A typical *hawala* transaction consists of a remitter, a recipient, and two intermediaries, that is, *hawaladars*. When transferring the funds to the home country, the migrant-remitter makes payment to an intermediary *hawaladar* in the remitting country. The *hawaladar* then contacts their partner service provider in the recipient country who then arranges for the payment in local currency to the beneficiary. The beneficiary is required to present a pre-agreed identification document or code. When this transaction is conducted, the agent in the remitting country is indebted to the agent in the recipient country. Their transactions are settled through similar transactions going in the opposite direction, cash payments, or bank account transfers. In some cases, their positions also can be transferred to other intermediaries."

money, and is able to offer competitive exchange rates (often better than formal channels; Nenova *et al.*, 2009) and low transactions costs (Amjad *et al.*, 2013). In addition, it does not require extensive documentation and paperwork for conducting transactions, unlike the formal banking system. These are important reasons for the persistence and salience of the *hawala* channels despite the expansion of formal banking in Pakistan. Amjad *et al.* (2013) find that migrant skill levels and most socio-economic characteristics do not significantly determine the choice of *hawala* v/s formal banking as the means of transferring remittances; intrinsic beliefs and personal preferences based on convenience appear to play a big role in the continuing reliance on *hawala* channels.

4.4 Empirical Approach

4.4.1 Approach to Causal Identification

I attempt to study the causal link between conflict exposure and remittance receipts using a cross-sectional dataset. Any OLS estimates for such analysis would be biased because of the endogeneity of conflict and remittance receipts, as unobservable factors that cause chronic poverty and enhance the need for remittances may also be responsible for conflict. Also, factors associated with the ability of households and communities to send migrants out and to receive remittances can potentially also enable them to resist the control of armed groups, and the spread of violence. To overcome these endogeneity concerns, I use an Instrumental Variables approach to identify the causal impact of conflict on remittance receipts, similar to the approach in Chapter 3 that examines the impact of conflict on access to cash transfer programmes.

Based on an understanding of the historical evolution and context of political violence in Pakistan, discussed in detail in Chapter 3 (Section 3.3), I use the nearest distance to the Afghanistan-Pakistan border as an IV for conflict. The underlying assumption of course is that distance to infiltration routes, after controlling for potentially confounding factors, predicts remittances only through its correlation with conflict and not directly.

As in Chapter 3, I use the distance to official border crossing points as an IV only for robustness checks and find that my main results are robust to the choice of IV (Annexe 4.1). In Chapter 3 I also use the community-level share of Pashtun population as an IV for conflict for robustness checks. However, this may not be suitable for the current chapter as ethnic identity can be strongly correlated with a history of migration and access to migration and remittance networks, which can directly affect remittance receipts, thus violating the Exclusion Restriction.

I now discuss the formal estimation procedure employed in this chapter, using the nearest distance between the community and the Afghanistan-Pakistan border as the IV for conflict exposure – measured as the natural log of 1 +n, the number of people killed in conflict in the *tehsil* over 2001-10.

In estimating the impact of conflict on remittance receipts at the household level the causal relationship of interest is given by Equation (1) below:

$$Y_{ij} = \alpha + \beta_1 X_{ij} + \beta_2 CON_{ij} + \beta_3 P_k + \varepsilon_{ij} \qquad \ldots (1)$$

Where

Y_{ij} is the likelihood of household i in PSU j receiving remittances (or later the Amount of remittances received in Pakistani Rupees, PKR)

X is the matrix of household /community-level control variables.

P represents the matrix of k Province dummies.

CON is the measure of conflict exposure at the *tehsil* level, and is assumed to be the same for all households/communities in the *tehsil*.

Owing to the endogeneity of *CON* with Y_{ij}, the coefficient β_2 is biased. I therefore estimate an IV probit and IV tobit models, represented by the following two-stage equations (2 and 3).

IV First stage Equation:

$$CON_{ij} \quad = \alpha \quad + \gamma_1 X_{ij} + \gamma_2 DISTANCE_j + \gamma_3 P_k + u_{ij} \qquad \dots (2)$$

Where DISTANCE represents the distance between community j and the international border with Afghanistan. The second stage equation is given by (3) below, where β_2' now reflects the causal effect of CON on Y_{ij}.

IV Second stage Equation:

$$Y_{ij} \quad = \alpha \quad + \beta_1{}' X_{ij} + \beta_2{}' \widehat{CON}_{ij} + \beta_3{}' P_k + \varepsilon'_{ij} \qquad \dots (3)$$

4.4.2 IV Estimation: Potential Threats and Mitigation

Chapter 3 (section 3.3.3.1) discusses why the distance to the Afghanistan-Pakistan border is a strong correlate of violence exposure in Pakistan over 2001-10. However, in order to be considered a good IV, I must ensure that the exclusion restriction is not violated, by controlling for any potential confounders. The community-level distance to the Pakistan-Afghanistan border can, in addition to predicting the onset and intensity of violence, also be correlated with several variables that directly determine remittance receipts. I identify a multitude of such factors and devise means to measure and control for their effects. The assumption is that after controlling for the factors enlisted below, the distance to Afghanistan does not predict remittance receipts, except through its association with violent conflict.

4.4.2.2 Potential Accessibility-related Confounders

Remoteness: Pakistan's border with Afghanistan forms the North-Western boundary of the country. Greater proximity to an international border also reflects a greater and considerable distance from the hinterland.[56] Areas close to the Pakistan-Afghanistan

[56] Speaking directly to Ahmed's exposition on the tensions between the core and the periphery in modern Islamic countries, including Pakistan (Ahmed, 2013)

border are generally remote, and therefore more likely for communities to be isolated and excluded from trans-regional/national migration/remittance networks. In order to ensure that the distance to Afghanistan does not simply reflect communities' isolation, I include, as controls, (a) province dummies to capture a wide range of unobservable and province-wide characteristics, (b) the shortest distance to the provincial capital, and finally (c) the shortest distance to the district headquarters.

Topography: Terrain and topography may affects the ease with which populations are likely to move out, develop migration networks and send remittances, as well as the ease of operation of financial operatives. To ensure that distance to the Afghan border is not conflated with topographic characteristics, I include community level controls for topography. While about 85% of all communities in the sample are inland plains alone, I control for each the following types of topography through dummy variables: inland plains, coastal plains, plateaus, hills, valleys, mountainous areas, deserts and "other" topography.

Proximity to Army: In Pakistan, the role of the armed forces can be critical for many governance activities, including remittance receipts. This may be because the presence of the army can, to some extent, allay fears among the local population about the safety of their family members when they decide to undertake migration which would eventually enable them to remit money back. However, this potentially enabling role that the armed forces can play in encouraging migration and future remittance access can be less effective in areas further away from their bases. In order to ensure that the IV is not confounded with greater distance from the Pakistan Army, I calculate and control for the distance between the community and the nearest armed forces' cantonment.

4.4.2.3 Potential Institutional Confounders

Infrastructure: Areas closer to the Afghan border such as the FATA have low levels of public infrastructure at the community level. Although poor community-level infrastructure is found across several parts of Pakistan, beyond the North-West, it is imperative that the measure of proximity to Afghanistan does not proxy a lack of infrastructure. Infrastructure, such as road connectivity, transport access, the presence and functioning of markets, and telephone and electricity connectivity is directly required receiving remittances, particularly through formal channels. I therefore control for community-level infrastructure by developing a count variable-based additive index of various types of physical infrastructure facilities, as described in section 3.3.3.2b.

State Presence: Populations in areas with lower state presence, in terms of state-run institutions and public services are possibly less attuned to formal procedures of banking and finance, and may lack the necessary identification documentation to access formal remittance channels. I therefore measure and control for state presence using an additive index of government bodies at the community level (see section 3.3.3.2b).

Ethno-linguistic Fractionalisation: Greater linguistic fractionalisation within communities, reflecting deeper cleavages between groups, can make access to remittance networks more difficult. In a situation of conflict (which may itself be more likely to arise in more deeply divided communities), such between-group differences may be exacerbated, resulting in lower local coordination and access to both, formal and informal (trust-based) modes of accessing remittances. Based on data on the language in which the survey interview was conducted, and given that the survey fieldwork teams were proficient in the use of Pakistan's major languages (including Urdu, Sindhi, Punjabi, Balochi, Pushto, Brahvi, Saraiki, Hindko and a few other languages[57]) to conduct interviews, the language of interview can be a good proxy of the respondent household's linguistic identity. I use this information to calculate an index of Linguistic Fractionalisation at the community (PSU) level, as described in Chapter 3, section 3.3.3.2b, to ensure that if associated with the distance to Afghanistan, linguistic fractionalisation does not drive the IV results.[58]

[57]Which ensures that the language of the interview was not constrained/affected by the survey teams' knowledge of languages

[58]Ethnicity, though often correlated with linguistic identity is not explicitly available for the respondent households

4.4.2.4 Other Controls

In order to ensure that the distance to the Afghanistan-Pakistan border, as an IV for conflict exposure, does not pick up the effect of factors it may be correlated with that affect households' ability to receive remittances, I add controls, including: age and sex of the household head, household size, number of male members in the household, and a measure of social connections of the household outside the community.

4.5 Results

4.5.1 Descriptive Statistics

About 12% of all households in the sample report receiving remittances. This share is higher for Khyber-Pakhtunkhwa and Punjab compared to Sindh and Balochistan. The average amounts of remittances received by a household that receives any remittances at all is Pakistani Rupees (PKR) 41,730.38 (roughly US$ 463 at US$ 1 = PKR 90.1919 as on 01 January, 2012). The average amounts of remittance money received were also higher in KPK and Punjab. Table 1 below provides descriptive summaries.

Table 1. Descriptive Statistics on Remittance Receipts: Any and Mean Value of Amounts Received (in PKR)

	No. of HHs Receiving Any Remittances	Share of HHs Receiving Any Remittances	Mean Value of Remittances (all HHs) - PKR	Mean Value of Remittances (Only HHs receiving remittances) - PKR
Punjab	382	16.43%	6,639.92	40,680.47
Sindh	165	7.55%	2,161.48	28,636.36
KPK	326	18.48%	9,520.56	51,906.19
Balochistan	58	3.80%	1,108.06	29,172.41
Total	931	11.93%	4,950.70	41,730.38
N	7802	7802	7796	925

4.5.2 IV First Stage Results

Table 2 below show the IV first-stage results for the instrumentation of conflict (log [1+n] deaths due to conflict over 2001-10) with the nearest distance to the Afghanistan-Pakistan border.

Table 2. Conflict and the Nearest Distance to the Afghan Border: IV First-Stage Results

	(1)	(2)	(3)
Distance to Afghan Border	-0.877***	-0.494***	-0.266***
	(-63.01)	(-31.56)	(-12.13)
Controls	no	Yes	Yes
Province dummies	no	no	Yes
N	7802	7786	7786
Partial F-statistic	160.93	101.82	14.99
Prob. > F	0.0000	0.0000	0.0001
Adjusted R-squared	0.3373	0.5393	0.5664

t statistics in parentheses
^Standard errors are clustered at the PSU (community) level
$^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$
Community Controls: Urban/Rural, topography, distance from administrative headquarters, intra-community linguistic fractionalization, community-level presence of infrastructure and state institutions
Household controls: Household size, Age of head, members' education levels, Farmland ownership, pre-flood livestock value, number of males, number of members over 14, household main occupation and enterprise ownership, female-headed (dummy), Flood-Exposure Index, Flooding Anomaly Index, No. of Contacts outside village (Social Connectedness), Received state transfers through CDCP – I and BISP programmes (dummies)

As we see in Table 2 above, as expected, conflict has a significant and strong negative association with the distance to the Afghan border. This is robust to the inclusion of controls and province dummies. Further the values of the F-statistic are sufficiently high to indicate a strong instrument (Stock and Yogo, 2005).

4.5.3 Main Causal Results

I first examine the effects of conflict exposure, measured as the sub-district-level value of log (1+n) killings over the 2001-10 period, on the (i) likelihood of receiving any remittances at all (using an IV probit model), and (ii) the amount of money received as remittances (using an IV tobit[59] model). Remittances here include both domestic and international remittances and the data do not allow me to distinguish the source of such remittances.

I control for a wide range of household and community characteristics, and include province dummies to capture unobserved heterogeneity at the province level. Community controls include distance to administrative capitals, the intra-community index of linguistic fractionalisation, the index of community infrastructure, index of the presence of state institutions, topography characteristics, and the distance from the nearest army cantonment. Household controls include markers of wealth, adult education, household demographics, access to household services, land ownership, occupational categories and enterprise ownership.

Conflict may reduce remittance receipts through its association with weaker/less effective social networks. Conflict may either arise in areas where people are more isolated and have weaker social networks, or long-term exposure to violent conflict could itself increase the isolation of communities and cause the otherwise better-connected households to completely move out, leaving behind populations with lower access to migration and remittance networks. To ensure that the causal effect of conflict on remittance receipts is not confounded by social networks, I control for household access to social networks by including a measure of the total number of contacts known to the household who could help the household (members) in cash/kind or in helping find a job in the IV estimation of the effect of violent conflict on remittances.

[59] To account for the left-censoring of observed amounts of remittance receipts at 0 (Wooldridge, 2002)

A wide literature explores the relationship between public transfers and private remittances and finds mixed evidence on public transfers crowding out private ones (Albarran and Attanasio, 2002; Kazianga, 2006; Juarez, 2009). This effect of public transfers on reducing remittances may be conflated with the effects of conflict *if* in fact conflict-affected areas are more likely to receive public transfers.[60] In Pakistan two large cash transfer programmes had been implemented around the time of the survey; the Citizen's Damage Compensation Programme (CDCP) – Phase I, a flood relief cash transfer, and the Benazir Income Support Programme (BISP), an unconditional cash transfer paid to women recipients in chronic poor households. I include dummies for household access to the CDCP – Phase I and BISP transfers as controls in the IV estimation of the effect of conflict on remittance receipts, to ensure that the effect of conflict on remittances shown below, is not confounded by any selective access to public transfers caused by conflict.

Table 3. Effect of Conflict on likelihood of receiving remittances: Probit and IV probit estimates

	Probit Estimates				IV Probit Estimates			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log (n+1) killings at tehsil level	0.009^{***}	-0.005	-0.003	-0.006^{*}	0.122^{***}	-0.138	-0.268^{*}	-0.431^{***}
	(3.15)	(-1.64)	(-0.90)	(-1.88)	(4.81)	(-1.29)	(-1.73)	(-3.37)
Province Dummies		Y	Y	Y		Y	Y	Y
Community Controls			Y	Y			Y	Y
HH Controls				Y				Y
N	7802	7802	7786	7767	7802	7802	7786	7767

Marginal effects; *t* statistics in parentheses
$^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$
Standard errors clustered at the PSU (community) level[61]
Community Controls: Urban/Rural, topography, distance from administrative headquarters, intra-community linguistic fractionalization, community-level presence of infrastructure and state institutions
Household controls: Household size, Age of head, members' education levels, Farmland ownership, pre-flood livestock value, number of males, number of members over 14, household main occupation and enterprise ownership, female-headed (dummy), Flood-Exposure Index, Flooding Anomaly Index, No. of Contacts outside village (Social Connectedness), Received state transfers through CDCP – I and BISP

[60] Unlikely in this particular case, as Chapter 3 has shown

[61] Although I measure conflict exposure at the tehsil level, I cluster standard errors at the PSU level because of the relatively lower number of tehsils in the sample (92, as against 498 PSUs), and because the intra-cluster correlation of remittance receipts is higher in PSUs (0.081) than in tehsils (0.056). For the amount of remittances received, the intra-cluster correlation in PSUs is 0.063, and in tehsils it is 0.046.

programmes (dummies)

Table 4. Effect of Conflict on Amount of remittances received (in PKR): Tobit and IV Tobit estimates

	Tobit Estimates				IV Tobit Estimates			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log (n+1) killings at tehsil level	5354***	-2171	-1837	-3195*	14746***	-978	-11461	-31298**
	(3.22)	(-1.17)	(-0.87)	(-1.89)	(4.81)	(-0.09)	(-0.73)	(-2.19)
Province Dummies		Y	Y	Y		Y	Y	Y
Community Controls			Y	Y			Y	Y
HH Controls				Y				Y
N	7796	7796	7780	7761	7796	7796	7780	7761

Marginal effects; *t* statistics in parentheses
Standard errors clustered at the PSU (community) level
$^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$
Controls as in Table 2 above

Tables 3 and 4 (col. 8) above show that after controlling for household and community characteristics, exposure to violent conflict has a strong negative effect on, both the likelihood and the quantum of remittance receipts for households. This is significant as it shows that even at the aggregate level, and immediately following devastating floods when the need for external support to households is high, households in areas with higher long-term exposure to violent conflict receive fewer and lower amounts of remittances.

The mean value of killings in the sample is 30.96. The coefficient -0.431 in Table 3 means that an increase in the level of killings per tehsil by 10%, from 30 to 33, for instance, would lead to a decrease in the likelihood of receiving any remittance by [ln(1.1)*0.431] 4.12%. Similarly, since the coefficient of log(1+n) killings in Table 4 is 31,298, an increase in the number of killings per tehsil by 10% would decrease the average amount of remittances received by [ln(1.1)*31298] PKR 2,983 (US$ 35 approx.[62]).

[62] At Exchange Rate US$1 = PKR 86.0605 as on 01 July 2011

Remittance responses to Flooding Variables

In the regressions above, the control variables include a measure of community-level flooding exposure as well as the degree of flooding anomaly, measured as described in Chapter 6. Interestingly, remittance receipts do not respond to the extent of flooding exposure per se, but are significantly higher in areas of more anomalous flooding, across both the intensive and extensive margins of remittance receipts.

Table 5. Effects of Flooding Exposure and Flooding Anomaly on Remittance Receipts

	Received Any Remittance (IV Probit estimate)	Amount of Remittances Received (IV Tobit estimate)
Log (n+1) killings at tehsil level	-0.431***	-31298**
	(-3.37)	(-2.19)
Flooding Exposure Index	-0.024	-3917.135
	(-0.51)	(-0.99)
Flooding Anomaly Index	0.177***	13661.406***
	(3.86)	(2.82)
N	7767	7761

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Controls as in Table 2 above

4.5.4 Mechanisms

I now examine what mechanisms likely explain the negative effect of conflict on remittance receipts. I consider three distinct possible mechanisms: the likely mode of remittance receipts (formal v/s informal channels), the presence of and threats from militant groups (linked to the TTP) and the likely motive for remittances (consumption v/s investment).

4.5.4.1 Mode of Remittance Receipt (Formal v/s Informal)

As noted earlier, remittances in Pakistan are received through both, formal and informal means. Here I explore if either of these two channels is particularly susceptible to disruption or sabotage in conflict. On the one had the reach of formal systems may be more curtailed in conflict-affected areas (or conflict may anyway be more likely to arise in more backward areas less integrated with formal banking and finance); on the other hand violent conflict may pose significant security risks to the informal modes of money transfer such as *hawala/hundi*, which rely in large part on local sub-agents and human couriers to transport wads of cash. These informal modes of transfer may be less willing or able to operate in violence-infested areas due to higher security risks, and may demand higher margins for doing so, which may make the informal channel more expensive to the remitter or the recipient. As there is no available data on the actual mode of payment used by households to receive remittances, I proxy the likely mode using information on whether or not the household has a bank account; the underlying assumption being that households with access to formal banking are more likely to use formal modes of transfer, while households without access to banking are more likely to rely on informal ones. I fully recognise that having a bank account is not a random occurrence but is associated with observable and unobservable household characteristics, many of which may also make households more/less vulnerable to conflict. However, by disaggregating the IV analysis across these different types of households (with and without bank accounts), I only attempt to examine if the negative effects of conflict on remittances are more concentrated among households using formal or informal channels (for a variety of reasons), and not on the choice of channel alone. I compare the IV estimate of exposure to violent conflict on remittances across sub-groups of households with and without access to formal banking in Table 6 below.

Table 6. Formal/Informal Modes of Money Transfer as a Mechanism linking Violent Conflict and Remittances

	Any remittance – IV probit estimate			Remittance Amount – IV tobit estimate		
	Full Sample	No HH Bank A/c	HH has Bank A/c	Full Sample	No HH Bank A/c	HH has Bank A/c
Log (n+1) killings at tehsil level	-0.431***	-0.472***	0.231	-31298**	-35400**	31159.107
	(-3.37)	(-3.80)	-0.5	(-2.19)	(-2.43)	-0.57
N	7767	6931	817	7761	6925	836

Marginal effects; *t* statistics in parentheses
$^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$ | Controls as in Table 2 above

Table 6 clearly shows that the negative relationship between exposure to violent conflict and remittance receipts is driven by households without access to formal banking, i.e. those that are more likely to rely on informal modes of money transfer. Such households are less likely to receive remittances at all, as well as conditional on receiving at all, get lower amounts. In contrast, conflict does not appear to have any effect on remittance receipts for households with formal bank accounts. This suggests that informal modes of payment may be more susceptible to disruption/reduced access with increasing levels of violence exposure, while the formal banking system is more resistant. The choice of mode of money transfer therefore emerges as a plausible mechanism linking conflict exposure with remittance receipts.

4.5.4.2 Security Risk: The Presence/Control of TTP-linked militant groups

The presence and control of militant groups, particularly the *Tehrik-e-Taliban* Pakistan (TTP) in Pakistan, can pose a security threat to economic activity in general, but the movement of physical sums of money in particular. The discussion on formal/informal modes of payment above suggests that informal means of transfer are more likely to be affected by violent conflict. Remittance flows may be hampered in areas of TTP presence/control if the TTP operatives on the ground are able to intercept and subsequently loot or tax the flows of money. Militants may also be suspicious of outsiders entering communities as human couriers of cash, and feel threatened that they may use the cover of remittance transfers to conduct covert intelligence gathering operations. This could potentially increase the security risk involved in accessing remittances for both recipients, and intermediaries – principally informal *hawala/hundi* operators. Alternatively, the security threats imposed by militant groups could dissuade many intermediaries from even entering areas of militant control, or demand very high margins which could render informal remittance transfers more expensive. For all these reasons the effects of conflict on remittances may be more pronounced in areas of TTP presence and control.

The incidence of violence alone need not however precisely reflect the presence of armed groups. Violence may be used by militants strategically and often in areas of contestation rather than in their domains of uncontested dominance (Kalyvas, 2006). While it is nearly impossible to obtain publicly available data on militant presence rather than the outbreak of violence, I attempt to proxy the presence of the *Tehrik-e-Taliban* (TTP) and its affiliate groups in Pakistan following the process outlined in Chapter 3, section 3.4.3.2, based on analysis of residuals from the community level estimation of girls' primary school enrolment rates – which treats TTP presence[63] as an omitted variable that lowers girls school enrolment, making communities with negative residuals more likely to be associated with TTP presence (and those with positive residuals less likely). This exercise results in the creation of sub-samples of greater and lesser likely TTP presence. In tables 7 and 8 below, I present IV estimates of the effect of violent conflict exposure on remittances across sub groups of the sample with greater and lower likelihood of TTP presence.

As an additional check, I also examine residuals from the estimation of the community-level gender gap in primary schooling (simply measured as the difference in the shares of primary school age boys and girls enrolled in school at the community level) to proxy the likelihood of non-state armed group control. Results along the two sub-samples based on residuals from the estimation of the gender gap in primary schooling are

[63] Henceforth TTP presence is used to refer to presence of the TTP as well as its affiliates

presented in Annexe 4.2, and broadly follow the same direction as from sub-samples based on residuals from the estimation of female primary enrolment rates.

Table 7. Likely presence of TTP (affiliates) as a Mechanism linking Violent Conflict and the Likelihood of Receiving Any Remittances

	Full sample	Residuals of Female Primary Enrollment Estimation	
		TTP likely present	TTP likely not present
Log (n+1) killings at tehsil level	-0.431***	-0.634***	-0.255
	(-3.37)	(-3.03)	(-1.60)
N	7767	3552	4215

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01
Controls as in Table 2 above

Table 8. Likely presence of TTP (affiliates) as a Mechanism linking Violent Conflict and the Amount of Remittances Received

	Full Sample	Residuals of Female Primary Enrollment Estimation	
		TTP likely present	TTP likely not present
Log (n+1) killings at tehsil level	-31298**	-47555	-16103
	(-2.19)	(-1.48)	(-1.02)
N	7761	3547	4214

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01
Controls as in Table 2 above

Table 7 shows that the negative effect of violent conflict on the likelihood of receiving remittances at all is much stronger in areas of more likely TTP presence, with stronger IV coefficients compared to areas with less likely Taliban presence. This suggests that armed group presence and threat is indeed a likely channel for the lower access to remittances in conflict-affected areas. However, as we see in Table 8, there are no significant differences in the effect of conflict on the quantum of remittance receipts between areas with greater/lower likelihood of TTP presence. While the magnitude of the effect of conflict on the quantum of remittances is higher in areas with more likely

TTP presence, this is not significant. This suggests that armed group presence reduces the initial access to remittances, perhaps by blocking/deterring remittance couriers from entering areas of their control at all, but if remittance intermediaries are able to enter such areas, it does not affect the quantum of remittances they transfer. This armed group presence appears to operate as a mechanism for violent conflict on the extensive margin of remittance receipts.

4.5.4.3 Informal Money Transfer and Security Risks: The Overlap

The findings in 4.5.2.2 connect with the earlier exploration of the effect of formal and informal modes of money transfer. Security risks from militant groups may be higher when households use informal modes of remittances, which potentially explains how conflict leads to lower remittances. I specifically explore the overlap of these two mechanisms, choice of mode of transfers (formal/informal), and the likely presence of TTP-affiliate groups to test if the negative effect of conflict on remittances is stronger when households do not have bank accounts (use informal modes), and are residing in areas with more likely TTP presence. Table 9 below presents the IV estimate of the effect of conflict on the extensive margin of remittance receipts among (i) household with/out formal Bank accounts, and (ii) in areas with more/less likelihood of TTP presence, based on residuals of community-level female enrolment rates.

Table 9. IV estimate of Effect of Violent Conflict on likelihood of receiving any Remittances across Formal Bank Account Access and Likely presence of TTP

	TTP likely present		TTP likely not present	
	No HH Bank Account	HH has Bank Account	No HH Bank Account	HH has Bank Account
Log (n+1) killings at tehsil level	-0.629***	-0.204	-0.334**	0.572**
	(-3.12)	(-0.11)	(-2.06)	(2.25)
N	3203	338	3728	466

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Controls as in Table 2 above

Table 9 provides interesting insights: the negative effect of conflict on receiving remittances is strongest among households without a bank account (using informal means) and in areas with more likely TTP presence. This suggests that armed groups are very likely to block or deter informal remittance payment operations. Conflict does not have any significant effect on remittance receipts on households who have bank accounts, even in areas with more likely TTP presence.

Even in areas with the lower likelihood of TTP presence, violent conflict has a negative effect on households without bank accounts, suggesting that mechanisms other than militant interception/threat are responsible, albeit to a lesser degree as indicated by the smaller coefficient, for lowering access to remittances. In these areas conflict has a positive effect on remittance receipts among households that are part of the formal banking network. This may be because when remittance transfers are not affected by security threats, the altruistic motivations for remittances dominate in areas exposed to conflict. Finally, Table 10 below shows that the overlap of mechanisms does not appear to significantly affect the amount of remittances received.

Table 10. IV tobit estimate of Effect of Violent Conflict on amount of Remittances received across Formal Bank Account Access and Likely presence of TTP

	TTP likely present		TTP likely not present	
	No HH Bank Account	HH has Bank Account	No HH Bank Account	HH has Bank Account
Log (n+1) killings at tehsil level	-45717	-47848	-25086	78623
	(-1.53)	(-0.23)	(-1.51)	(1.45)
N	3198	349	3727	487

Marginal effects; *t* statistics in parentheses
$^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$
Controls as in Table 3 above

4.5.4.4 Likely Motive for Remittances: Consumption v/s Investment

I have previously discussed how conflict may have opposite effects on remittance receipts depending on the motive for sending remittances. If conflict increases economic hardship, remitters will seek to send money to help alleviate some of the suffering of family members left behind, thus resulting in increased remittance inflows into conflict-affected areas. If, however, remittances are meant for investment purposes, in expectation of future returns, violent conflict can increase risk and signal uncertainty for the future, causing remitters to reduce their investments in conflict-affected areas. In the analysis so far we find that at an aggregate level, conflict reduces remittance receipts at both, the extensive and the intensive margins. Such effects may however vary across groups that receive remittances for alternate predominant purposes: consumption and investment. While it is not possible to identify what was the main motive behind the remittances received, I test the effects of conflict on remittances across groups that are likely to have different motives for receiving remittances. Specifically, I examine whether the effect of conflict on remittance receipts varies across monthly per adult equivalent food consumption expenditure quintiles, with the assumption that households in lower quintiles are more likely to receive remittances to support consumption, whereas those in higher quintiles are more likely to receive investment-focused remittances. The IV estimates of the effect of conflict on remittances across food expenditure quintile groups are shown in tables 11 and 12 below.

Table 11. Effect of Conflict on Likelihood of Any Remittance Receipt: Across Food Consumption Expenditure Quintiles

	Full Sample	Monthly per Adult-equivalent Food Consumption Expenditure Quintiles				
		Q1	Q2	Q3	Q4	Q5
Log (n+1) killings at tehsil level	-0.431^{***}	0.543^{**}	-0.649^{***}	-0.620^{***}	-0.167	-0.440^{***}
	(-3.37)	(2.15)	(-4.34)	(-4.04)	(-0.57)	(-2.99)
N	7767	1542	1558	1540	1550	1543

Marginal effects; *t* statistics in parentheses
$^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$
Controls as in Table 2 above

Table 12. Effect of Conflict on Amount of Remittances Received: Across Food Consumption Expenditure Quintiles

	Full Sample	Monthly per Adult-equivalent Food Consumption Expenditure Quintiles				
		Q1	Q2	Q3	Q4	Q5
Log (n+1) killings at tehsil level	-31298**	64914	-64936*	-57789**	-11742	-29574*
	(-2.19)	(1.54)	(-1.96)	(-2.17)	(-0.44)	(-1.65)
N	7761	1553	1556	1551	1549	1552

Marginal effects; *t* statistics in parentheses
$^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$
Controls as in Table 2 above

Tables 11 and 12 indicate that the aggregate negative effect of conflict on remittances does not operate for the lowest expenditure quintile, which is more likely to receive remittances meant to support consumption. In fact, conflict is likely to increase the likelihood of receiving any remittances even though the amount of remittances received by households in this quintile does not vary by conflict exposure. This suggests that for the lowest expenditure quintile the receipt of altruistic remittances increases with conflict, even as the amounts of money received do not. The aggregate negative relationship between conflict exposure and remittances, at both the extensive and intensive margins, however, appears to be driven by higher expenditure quintiles. These groups are less likely to be food insecure or struggling for survival and therefore more likely to use remittances for investment, compared to the lowest quintile. Conflict then has a negative effect on remittances in these higher food expenditure quintiles probably because remittances respond negatively to the higher risk and uncertainty that long-term exposure to conflict signals in these areas. Alternatively, this negative effect could be because, owing to security risk and dwindling economic prospects, remitting migrants from conflict-affected areas are reconsidering their long-term pecuniary interest in their native communities and do not envision a return to their native communities as much as remitting migrants from more peaceful areas may. For the bottom quintile, however, supporting survival, more than future investment is the primary motive for remittances. For this group, conflict therefore appears only as an additional cause of hardship rather than an investment risk factor; compelling remitters to maintain (even increase, at the extensive margin) the modicum of support to households.

4.5.5 Robustness checks

I test whether the main causal relationships explored in this chapter are robust to an alternate Instrumental Variable, i.e. the distance to the nearest official border crossing on the Pakistan-Afghanistan border. I find that the results are robust to this alternate IV, and present these results in Appendix 4.1.

I also examine if the results on the effect of likely TTP presence on remittance receipts presented in Tables 8 – 11 are robust to the determination of likely TTP presence based on residuals from the community-level estimation of the gender gap in primary school enrolment. I find that the results follow the same direction as those presented above, based on residuals from community-level estimation of female enrolment rates, (see Appendix 4.2).

4.6 Summary of Results and Conclusions

This chapter has examined the causal effects of long-term exposure to conflict, measured at the micro level, on households' receipt of remittances. Using IV estimation to overcome the endogeneity of conflict exposure and remittance receipts, and controlling for a range of confounding factors, I find that, contrary to the literature from country-level case studies in the immediate aftermath of crisis events, long-term exposure to conflict reduces households' receipts of remittances at both, the extensive and the intensive margins.

This analysis would have benefitted immensely from the availability of data on remittances disaggregated by the source of such remittances – i.e. domestic vs. foreign. This is especially true given that since much of Pakistan was affected by the 2010 floods, the floods could have altered the migration trajectories and remittance-sending behavior among sending households (not included/ observed in the dataset). International remitters, would however, be insulated from the floods. Exposure to floods may have reduced the ability to domestic remitters to send remittances to their families and relatives who were also affected by the floods. In the absence of data on the source of remittances and the identity/ location/ flood exposure of remitters, I am unable to factor in how flooding exposure may have affected domestic remittance receipts through effects of remitters. However, since the focus of this chapter is on the causal effects of conflict on households' remittance receipts, I assume that the extent of flood exposure of remittance-sending households is not related to the extent of conflict exposure of receiving households (i.e. remittance receivers' conflict exposure does not affect the extent to which remittance-senders are affected by flooding). The lack of data on remittance sources limits the scope of analysis in the chapter, and yet, under the assumption stated above, does not pose a fundamental threat to the main causal identification of interest.

I find that informal modes of money transfer (rather than using formal banking), and the likely presence of Taliban-affiliate armed groups, and more strongly, the overlap of these two factors reduces remittance receipts in Pakistan. This suggests that the informal money transfer systems are perhaps more susceptible to interception, disruption and sabotage by militant groups.

While existing studies have pointed out some security threats to remittance payments in conflict-affected settings, none have specifically explored this factor in much detail. I find that the mode of money transfers is an important channel through which conflict may impede access to remittances, particularly when militant groups are able to threaten and disrupt informal transfer channels, either to stop, loot or tax inflows of cash into areas under their control, or to prevent the entry of outsider money transfer agents due to suspicion or fear of covert intelligence gathering. On the other hand, conflict does not have any effect on the receipt of remittances by households that have formal bank accounts (and that are therefore more likely to rely on formal money transfer arrangements), regardless of the likely presence of the Taliban and affiliate groups. The obvious policy implication is to expand, to the extent possible, the coverage of formal banking in conflict-affected areas, to insulate households from the intent and capability of militant groups to subvert the informal money transfer mechanisms and thereby reduce households' access to remittances.

Another key finding of this chapter is that the negative effect of conflict exposure on remittance receipts is driven by higher consumption expenditure quintiles. In the lowest food consumption expenditure quintile, conflict does not reduce the receipt of remittances. To the extent that the motive for remittances moves from consumption-support (altruism) to investment as one moves to higher expenditure quintiles, it appears that conflict exposure does not appear to affect much the remittances directed to support the more needy households maintain consumption levels; but is likely an important consideration for investment-focused remittances. Long-term exposure to conflict may make investments less attractive due to dampened economic activity as a result of violence, security risk to (more conspicuous) investments and assets, or a changed preference and priority on part of remitters away from their conflict-infested origins to the relatively safer and more prospective (economically) migration destinations. I find suggestive evidence for conflict potentially affecting investment prospects and changing remitter households' pecuniary interest in origin areas. This factor, hitherto ignored in country-level analyses, emerges as an important microeconomic insight into the link between long-term conflict exposure and household remittance receipts. The impact of long-term exposure to conflict, measured at the micro level, may be very different from what is often observed at the national level in response to particular and sharp outbreaks of violence. While the latter events have been associated with drawing in high levels of external help in the form of remittances, an environment that is steadily embroiled in deep strife and violence may, over the long-term, have the opposite effect on remittances as communities may have to cut their economic associations with increasingly risky and unsafe areas.

This analysis also underscores the importance of distinguishing immediate from long-term effects, and compels a separate paradigm for examining long-term and persistent conflict, distinct from short-term events of violence. Areas reeling under violent conflict for long periods of time have deep and often intractable economic and social problems. Remittances are not always a simple means of overcoming the challenges of supporting economic activity and human development in such areas over the long term. As such, policy initiatives must be cognisant of the limitations that remittances themselves are likely to face in such environments. Over the long term, remittances too suffer due to the institutional, infrastructural and market frailties that give rise to, or are exacerbated by violent conflict.

Chapter 5. Unintended Consequences of Aid? Conflict, Cash Transfers and Gun Ownership in Pakistan

ABSTRACT: I examine the effect of unconditional flood relief cash transfers on gun ownership in the aftermath of the massive floods in Pakistan in 2010. Using propensity score matching to overcome selection bias in treatment assignment, I find that for the population as a whole, the cash transfers did not have any significant effect on the likelihood of buying guns. However, for households with 1.5 acres or more of land and residing in conflict-affected areas, the transfer increased the likelihood of acquiring a gun by 8.3%. This effect is more pronounced for the wealthy households that suffered displacement and had to live in flood relief camps. As the flood relief camps were often marked by criminal acts including extortion, theft, robbery and assault, living in a flood relief camp likely increased safety concerns. Given this background and the fact that wealthy households are less likely to have pressing material needs (viz. security needs), such households may have found it optimal to use cash transfer receipts to bolster their sense of security by acquiring guns. I also find that land ownership, elevated topographical features, and proximity to the Afghanistan-Pakistan border (a positive correlate of both, exposure to violence, and the availability of guns) have a significantly positive association with household gun ownership.

5.1 Introduction

Humanitarian aid during crises can help provide a modicum of support to the poor, prevent households and individuals from falling into poverty traps or below critical thresholds of poverty, enable people to invest in human and material capital required to move out of poverty, and potentially build resilience to weather economic shocks. Cash transfers, in particular, have been seen as an effective means to deliver such aid to the poorest and those in the greatest need of protection from economic shocks (Duflo and Banerjee, 2010; Blattman, 2014).

The strong coincidence of conflict and poverty in many countries across the world (WDR, 2011), as well as a vast literature examining the links between conflict and poverty (Justino, 2013) have generated much interest in the potential of aid programmes (in general, and cash transfers in particular) to reduce poverty, and therefore usher in peace. Yet, the enthusiasm over such potential has been subject to critical examination in recent years, as studies have shown that the presence of conflict may itself impede the rollout of aid programmes (as identified in Chapter 3 of this thesis, as well as by Crost *et al.* 2014, Beath *et al.* 2012), as well as perversely, increase the likelihood of violence, at least in the short run (Khanna and Zimmermann, 2014). The effects of aid therefore may vary considerably according to the prevailing security situation and political setting, invoking the need for cautious and careful planning while rolling out cash transfer programmes in conflict-affected areas.

There also exists the possibility of recipient states diverting aid receipts towards building their own military capacity, or arming specific violent groups. This possible route of unintended militarisation through aid is often examined at the macro level, in terms of the direct diversion of funds by the recipient from budget heads related to the intended human development outcomes of the aid (education, health, infrastructure, social protection etc.) to military ones (Collier and Hoeffler, 2007; Kono and Montinola, 2012; Khilji and Zampelli, 1994). What has not sufficiently been studied, however, is the possibility of such diversions taking place at the local, and household levels. The profusion of guns and small arms in many countries, and their use and prominence in intra-state conflict, calls for a closer inspection of whether aid receipts in the form of cash may be used by households to arm themselves, either in support of local insurgent, militant or paramilitary groups, or to safeguard against them. Any likely militarisation attributable to the receipt of humanitarian aid (in the form of cash transfers) through an increased proclivity of guns' and small arms' ownership at the household and community level, could be an unintended consequence. This may be especially likely when aid receipts in the form of cash transfers can alleviate liquidity constraints of households that face security threats on the one hand, and have high levels of wealth and income, but insufficient liquid assets which they can use to respond to such threats (in the Pakistani context, likely through the acquisition of guns).

While the possession or acquisition of guns can lead to increased violence (Cook *et al.*, 2001; Hemenway and Miller, 2000; Small Arms Survey, 2001, 2002; Killias *et al.*, 2001) resulting in greater homicide rates, brutalisation and fear, some studies also find that the possession of guns can, at the local (community/household/individual) level serve as a deterrent to being attacked and thus provide a sense of safety. To that extent, gun ownership need not always be a social or household 'bad', taking away from human development (if for example, it enables people to remain alive, at all). Yet the diversion of *humanitarian aid* money, (in the aftermath of natural disasters, for instance) for acquiring guns would mean lower expenditures on other inputs required for immediate relief, sustenance and building capacity to escape poverty. This can be a concern for human development outcomes.

That the relative usefulness and need for guns will be higher in areas with greater exposure to, and expectation of violence, compared to tranquil areas is obvious. This would mean that households hit by a humanitarian crisis and living in conflict-affected settings may face a strong trade-off between short-term consumption goods (immediate relief materials, food, clothing and shelter) and durables replenishment (house and farm damage repairs for example) on the one hand, and security goods, such as guns, on the other. This can be particularly true when insecurity is rife, and the state is unable to fully provide security to all people, compelling households to take steps to ensure their own security. Upon receiving cash from humanitarian aid programmes, some households that face security threats and own wealth mostly in the form of immobile and illiquid assets may be likely to use the money to acquire guns – leading to higher local militarisation, as well as potentially lower recovery of lost human and physical capital, and therefore the persistence of poverty and underdevelopment.

Against this background, I attempt to examine the effect of the receipt of unconditional flood relief cash transfers following the 2010 floods in Pakistan on the acquisition of guns at the household level, particularly in areas affected by violence. I situate this in a larger research question on what are the determinants of gun ownership in Pakistan in general and attempt to answer the following specific questions:

(i) What are the household and community-level correlates of gun-ownership in Pakistan?

(ii) How does the receipt of unconditional flood relief cash transfers affect the likelihood of gun acquisition?

(iii) What factors can suggest why particular households or groups may be likely to divert flood relief transfers away from relief and rehabilitation and towards buying guns?

I use household-level survey data collected after the 2010 floods in Pakistan, which includes data on flood relief transfer receipts, gun ownership status and a wide range of socio-economic characteristics at the household and community levels. I first analyse the correlates of gun ownership at the household and community levels using a simple probit estimation of the likelihood of gun ownership at the household level, and a Tobit estimation for the rate of community-level gun ownership rates. Next, I attempt to examine whether the receipt of unconditional flood relief cash transfers increases the likelihood of acquiring guns. In order to do so, I only consider those households that did not own a gun prior to the 2010 floods and then examine the extent to which the receipt of the flood relief transfers is likely to have caused them to acquire guns in the year following the 2010 floods, using both simple probit estimation, as well as propensity score matching to calculate the average treatment effect on the treated. Finally, I attempt to examine if the Average Treatment Effect on the Treated (ATET) is heterogeneous across particular groups/types of households and areas that differ in terms of exposure to conflict.

I find that compared to a matched set of non-recipient households, flood relief recipients are no more likely to have acquired a gun in the year following the floods, across conflict-affected and peaceful settings. However, when I undertake disaggregated analysis across specific groups of households, I find that in conflict-affected areas, large land-owning households who receive flood relief transfers are significantly more likely to have acquired a gun in the year following the floods, compared to a matched set of non-recipient large farmers. These effects are stronger when I restrict the analysis to larger land-owning households in conflict areas that had to live in displacement camps following the flooding. This suggests that heightened security concerns in a new environment, such as the flood relief camps, where wealthy households possibly felt more vulnerable than in their communities before the floods, may have led them to acquire guns to feel more secure. This also highlights the role of cash transfers in providing wealthy land-owning households with the liquidity required to purchase guns (as their income and wealth may arise from highly immobile and illiquid assets). It is also important to note that for such wealthy households, economic sustenance is possibly ensured to a greater extent than is physical security, which may further suggest why security goods such as guns may have higher relative priority in any exogenous increases in their cash holdings.

I also find that gun ownership is associated with male members' primary education (viz. illiteracy), larger land ownings, enterprise ownership, household access to drainage facilities, and communities that are situated in plateaus, valleys and mountains, those that are close to the Pakistan-Afghanistan border,[64] and are further from army cantonments.

The following section reviews the literature on the links between gun ownership, use and human development and security, and on the extent of and practices relating to gun ownership in Pakistan. Section 5.3 outlines the data used and the empirical strategy. Section 5.4 presents results – including descriptive statistics, simple probit estimates of the correlates of gun ownership, and propensity score matching-based treatment estimates of flood relief receipts on gun acquisition for the whole sample and across sub-populations. Section 5.5 summarises and concludes with notes for policy.

5.2. Conceptual Framework and Literature Review

5.2.1 Conceptual Framework

This chapter focuses on gun ownership and the factors associated with it, including the receipt of aid in the form of cash transfers. From a security and development standpoint,

[64] from where guns are smuggled into Pakistan, as well as a correlate of exposure to violence following the infiltration of the Taliban post 9/11 and the War on Terror

gun use can have grave direct and indirect implications on household and individual welfare (to be explored in greater detail in 5.2.2 below). Gun ownership per se, however, affects security and development largely through the use (misuse) of guns for perpetrating violence and as an instrument of threat. Some studies find that for particular groups or individuals, owning a gun can enhance security and deter attacks emanating from inter-personal crime (Kleck and Gertz, 1995; Lott and Mustard, 1997). Others show that access to small arms is positively associated with violent deaths and criminal activity (Cook *et al.*, 2001; Hemenway and Miller, 2000; Small Arms Survey, 2001, 2002; Killias *et al.,* 2001). More recent studies in developed countries find much stronger evidence for gun ownership increasing, rather than deterring homicide, particularly firearm-related homicide (Bangalore and Messerli, 2013; Siegel *et al.*, 2014).

However since data on gun use for violent or criminal activity is seldom available at the household level, I focus on gun ownership. The Small Arms Survey (henceforth SAS) 2003, recognises the distinction between gun ownership and gun use, and yet argues that "small arms availability is a predisposing rather than a fundamental cause of underdevelopment."[65] The following analysis is based on the premise that gun ownership predisposes households and communities to the security and human development consequences of gun violence.

The recent emphasis on rolling out aid programmes in conflict affected and fragile states, as a means to achieve a reduction in violence has received critical attention (Berman *et al.,* 2011; Crost *et al.,* 2014, Khanna and Zimmerman, 2014).[66] These studies have drawn attention to the potential of insurgents and rebel groups to scuttle programmes and limit the reach of the state in areas of their control – often through the exercise of violence. Yet, one possible route through which aid may increase the likelihood of violence – civilian militarisation, remains under-studied.

Conditional on receiving aid at all, it is likely that households living in conflict-affected areas may face a compelling trade-off between material well-being (as intended to be achieved by aid programmes, including cash transfers) and physical security. When

[65] SAS, 2003. pp. 128
[66] And indeed Chapter 3 of this thesis

households in such areas have easy access to guns, which can enhance the sense of safety in an insecure setting, many may prefer to divert resources towards acquiring guns, even at the cost of other goods and services that directly increase consumption and welfare. The relative preference for security goods (guns) viz. consumption goods may be higher for groups that are further away from critical thresholds of survival, i.e. the rich and the wealthy – who in fact may also be at greater risk of becoming the targets of violence. For such groups, access to guns may be more curtailed by their own liquidity constraints (if wealth is held in land and other immovable assets, such as with large land-owning households), than by physical access to gun markets (as is the case in much of rural Pakistan). Justino (2009) examines households' simultaneous vulnerability to violence and to poverty and argues that households that have low vulnerability to poverty and have high accumulated wealth, but face high exposure to violence may move to more secure areas to reduce exposure to violence. However, if their accumulated wealth is in the form of immobile assets such as land, such groups may not be able to leave their communities for safer destinations. I situate (Question No. 2 and 3 of) my research in this framework and examine whether land-wealthy households who are unable to move out even in the face of violence, use cash transfers to secure themselves within their communities – through the acquisition of guns.

The role of cash transfers, rather than accumulated wealth/ income in financing the acquisition of guns is critical to this chapter. It can be argued that well-off households that face low material deprivations and high vulnerability to violence may not need (to wait for) exogenous cash transfers to purchase guns – they may have acquired them in the past, i.e. before the floods and the ensuing flood relief cash transfers, or alternatively, they may be able to buy them out of their own resources, rather than from state-funded transfers. In an alternate formulation, households that acquired guns after the 2010 floods may be very different from those that did earlier, and so gun purchases from flood relief cash transfers may have been undertaken by a set of households that are very different from those who purchased guns earlier, i.e. out of existing (pre-flood) wealth and income. I address this concern in two ways.

First, I discuss liquidity constraints faced by large landowning households in Pakistan, and how cash transfers can enable gun purchases by alleviating such liquidity constraints. In rural Pakistan, despite being financially well-off, land-wealthy households may face severe liquidity constraints because the bulk of their wealth is in the form of immovable land and properties. In the aftermath of the floods, these households were more likely to have faced an acute shortage of cash (relative to earlier times, even if they had higher absolute amounts of cash compared to the poor/ landless, for example) as land holdings and immovable assets may have suffered damages, and their incomes from such sources may have been reduced or stopped. The exogenous infusion of cash through flood relief transfers could then have alleviated liquidity constraints, and in an insecure environment (marked by community exposure to violent conflict, and households' experience of living in flood relief camps that were affected by crime and conflict), led such households to acquire guns.

Secondly, I examine whether households that only acquired guns after the 2010 floods differ statistically from households who owned guns before (the 2010 floods, and the flood relief transfers) in terms of observable characteristics, and find that by and large, these sets of households do not differ significantly on observable characteristics (Appendix 5.4).

5.2.2 Guns and Human Development

This section draws heavily on the comprehensive review of the effects of small arms on human development by SAS (2003), which considers separately, the direct and indirect effects of small arms (mainly guns) on development.

The most serious direct effect of gun ownership and use is the incidence of death. Unlike many other weapons, guns can cause immediate death, can be used by the shooter from a distance and without much strenuous effort. As such, the fatality rate in crimes committed with guns is particularly high compared to other weapons. It is estimated that over 500,000 people are killed because of small arms misuse in both conflict-affected and other countries (WHO, 2002; Muggah and Griffiths, 2002).

In addition to deaths, non-fatal injuries are a serious consequence of gun violence. These in turn result in lower productivity and reduced earnings for the survivors. Many people who are injured in gun attacks also go on to suffer from partial or complete disability (Ferriman, 2002; Kobusingye, 2002). Injuries and disability may in turn leads to higher medical expenses for the household and greater levels of debt.

The indirect effects of gun violence pertain to heightened criminality, the rising costs of economic activity, declining investment and business climate, strained social cohesion and disruptions of social services and development interventions. In section 5.2.1 I have discussed the mixed evidence on the relationship between gun ownership and violent crime, identifying studies that indicate that guns can be used to both, perpetrate and deter violence in different settings. In addition to violent crime and homicide itself, gun use is also associated with other forms of crime such as drug trafficking (James, 2002), intimidation, kidnapping and disappearances (Muggah and Berman, 2001).

Economic activity can suffer as a result of gun violence. This may be due to several factors, including: higher transaction costs to account for security – for example through increased transportation costs to avoid violence-affected routes (SAS, 2003), weak enforcement of rules and contracts that facilitate trade, the use of guns to swing the terms of trade in favour of local rebel leaders (Ross, 2002; Reno, 2002), the disconnection of transport and trade networks that reduce local producers' access to markets, the erosion of profitability of several value-adding activities in agriculture leading communities to reduce marketable surpluses and move back towards subsistence farming (World Bank, 2002; Goudie and Neypati, 1999), and the destruction of physical capital that complements or sustains private sector production and investment, caused by violent activity involving automated guns, for example (SAS, 2003).

Gun violence can also dampen the investment climate and negatively affect specific industries such as tourism. James (2002) notes that concerns over crime are "as much about corporate survival as about personal safety." According to the World Bank (2001), violence and insecurity were seen as the top source of business risk by investors. Although the Economist Intelligence Unit (EIU, 2002) found no significant relationship between gun crime and FDI inflows at the country level, they state that there may be disaggregated effects across industries where the location of the investment site is flexible (as against mineral extraction industries, for instance).

Furthermore, gun violence can affect the access to and the quality of essential services such as health and education. Chapter 3 of this thesis examines how exposure to violence in general can limit access to cash transfers in Pakistan. Social services staff such as doctors, teachers, immunisation workers, as well as educational and health facilities may be directly targeted (Muggah and Batchelor, 2002). The fear of being attacked can also deter households from seeking services; for instance, students' school enrolment and attendance may decline (World Bank, 1996; Stewart and Fitzgerald, 2000; Luckham *et al.*, 2001) as a result of the threats of gun violence. An insecure environment may also cause international development agencies such as UN agencies and NGOs to scale back and withdraw from areas, especially when the safety of their staff members is likely to be at risk (SAS, 2003). Further, higher costs incurred by these agencies for providing security represents a diversion of resources away from development purposes (Muggah and Batchelor, 2002). All these factors can lead to under-investments in human capital, further impeding the progress on development targets and the fight against poverty in many countries.

Finally, gun violence can harm social cohesion and affect other social dynamics. The environment of fear and insecurity created by gun violence can lower political participation at the community level as members may use violence and force, rather than collaborative problem solving mechanisms to resolve disputes. Access to guns can also overthrow traditional systems of social organisation pertaining to resource management, land-tenure and community security. Gun violence can also destroy social capital and community cohesion (SAS, 2003; Jefferson and Urquhart, 2002). To the extent that these factors have a detrimental effect on human development, they are channels through which gun violence harms present and future prospects for development.

5.2.3 Civilian Gun Ownership in Pakistan

5.2.3.1 Estimates of Gun Ownership in Pakistan

It is estimated that civilians in Pakistan own up to 18 million guns, of which only 7 million are licensed (Karp, 2007). This makes Pakistan the 6th highest ranked country in terms of the number of privately owned guns. The rate of total private gun ownership in the country is 11.6 firearms per 100 people. This is much higher compared to similar estimates from other countries in South Asia and Pakistan's immediate neighbourhood, as shown in Table 1 below:

Table 1. Rate of Private Gun Ownership per 100 people: Select South Asian countries

Country	Guns per 100 people
Pakistan	11.6
Afghanistan	4.4
India	4.2
Nepal	0.8
Bangladesh	0.5
Sri Lanka	1.5
Maldives	6.4
Bhutan	0.3
Iran*	5.1
S. Asia Average (excludes Pakistan, Iran)	3.7

*Iran is not part of South Asia but is included as it neighbours Pakistan
Source: Karp, 2007: Appendix 4

Table 1 points to the high level of civilian militarisation in Pakistan, relative to its extended neighbourhood. The figures above are likely to be underestimates of actual small arms ownership owing to underreporting. According to Abbasi (2013), gun ownership is very likely underestimated in rural Pakistan. Further, the above statistics do not include assault rifles which abound across several parts of rural Pakistan. It is important to note that the above estimates are of the total licensed and non-licensed (illicit) guns owned by citizens. While this excludes guns owned by the armed forces and the police, these numbers do not pertain only to non-combatants. This is because many guns may be held by terrorist, militant, insurgent and criminal groups who are involved in violent conflict. In practice it is virtually impossible to identify how many weapons are held by such groups viz. non-combatant civilians.

5.2.3.2 The Regulatory Framework for Guns Production, Sales and Purchase/Ownership

The high prevalence of small arms ownership among civilians in Pakistan is partly the outcome of an insufficient and ineffective regulatory framework. While the law in Pakistan requires that holders, producers and traders of guns acquire licenses, historically this has not been very strictly followed. In recent years, and under the aegis of the United Nations Programme of Action on Small and Light Weapons (UNPoA-SALW), Pakistan has imposed a complete ban on new arms licenses since June 20th, 2013 (Pakistan Mission to the UN, 2014), subject to certain exceptions. In practice however, it is still possible to obtain licenses by exploiting loopholes in the rules, as well as to acquire guns without a license, particularly from informal and unregulated arms workshops, and from arms traffickers who smuggle guns in using both land and sea routes. Political contacts are also very helpful in obtaining gun licenses, as elected representatives had the right to approve permissions for awarding gun licenses.[67] While the more recent regulation has sought to limit the number of licenses issued to both buyers and manufacturers of guns, other aspects of regulation are not very strict. For example, there is no limit on the number of firearms or the quantity of ammunition a license-owning individual can possess, nor any requirements of references or of undergoing firearm safety training for being allowed to possess guns (Alpers and Wilson, 2015).

Private gun sales are permissible under the law in Pakistan, and dealers are required to obtain a license to sell guns. However, gun shows and private firearm dealing events are not prohibited by law. There is a very large number of informal guns and small arms markets, selling both, locally manufactured guns, as well as guns imported and smuggled in from abroad. Dara Adam Khel, a small town in the Federally Administered Tribal Areas (FATA) is a huge centre for illegal arms production and has a very large market for guns. According to a report published in *The Express Tribune*, workshops in

---

[67] For Middle-Class Pakistanis, a Gun Is a Must-Have Accessory. *The Wall Street Journal*. 6 January, 2009.

the Dara Adam Khel area have the capacity to manufacture 100 AK-47s at a cost of under US$ 150 per weapon.[68] The guns manufactured in Dara Adam Khel are typically not marked, and recent efforts by the government of Pakistan have sought to strictly implement a system of marking on all arms that are produced here, in accordance with the provisions of the UNPoA-SALW. The government has also sought to bring the local arms-smiths of Dara Adam Khel under the supervision of the (state-run) Pakistan Ordinance Factories (Pakistan Mission to the UN, 2013).

The Dara Adam Khel region produces an estimated 20,000 types of weapons (including pistols, revolvers, shot guns, sniper rifles, carbines guns and copies of Kalashnikovs and AK-47s, as well as ammunition and explosives) making it the largest centre of private small arms manufacturing in Pakistan. Apart from Dara Adam Khel, guns markets are located at several locations in FATA and in several cities including Rawalpindi (bordering the federal capital, Islamabad), Peshawar (the provincial capital of KPK), Quetta (capital of Balochistan) and Karachi (capital of Sindh and Pakistan's largest metropolis). In addition to locally made guns, weapons including pistols, rockets, grenades, anti-aircraft guns and anti-tank shells are also smuggled into Pakistan from Afghanistan along the long border spanning parts of FATA, KPK and Balochistan. Weapons are also imported and smuggled in on sea from Arab and East African countries (Abbasi, 2013). These factors contribute to sustaining and intensifying ongoing conflict dynamics, as terrorist, sectarian and insurgent militants, as well as criminal gangs can acquire guns and other small weapons relatively easily.

5.2.3.3 Social, Cultural and Security Motivations for Gun Ownership and Purchase in Pakistan

Private purchases of guns are motivated by a number of factors. In many parts of Pakistan, particularly in villages, guns are seen as a status symbol, through which the traditional elite assert and display their superior social standing. Gun ownership invokes both, fear, and respect, thus fostering, in many cases, a subservient loyalty. According to

---

[68] The Weapons Trail – part 1: Where do 20m illegal arms come from? *The Express Tribune*. 17 May, 2012.

Sifarish Khan, a gun-buyer interviewed by the Wall Street Journal in 2009, "A gun can be your friend… More bullets, more friends."[69]

Gun ownership and use also have cultural significance in many parts of Pakistan. In Pashtun and Baloch dominated areas, guns are used not only as weapons in inter-tribal rivalry or by and against terrorists and insurgents, but also on festive occasions such as weddings (where celebratory shots are fired in the air), for hunting, and as sport.

Bearing guns has become intertwined with cultural identity among many Pashtun and Baloch tribes, in depictions in popular culture as well as in news media articles (even as academic scholarship on cultural aspects of gun ownership – in the form of journal articles and also any grey literature, is unavailable, to the best of my knowledge at the time of writing this paper). According to Abbasi (2013), "In the tribal belt of the Pak-Afghan border guns are part of the daily attire and no 'self-respecting' Pashtun would be seen without a visible weapon. For those who are less fortunate and cannot own a weapon, there are shops that offer weapons for hire on an hourly basis, charging a nominal fee." The celebrated British television host, Michael Palin (2004), records in his travelogue spanning parts of the Afghanistan-Pakistan border the following comment made by his guide and informant on the prevailing 'gun culture' in Pakistan's North-West, "For them [the people who live on the North-West (Afghanistan-Pakistan) Frontier]… a gun is a social necessity. Pathans [Pashtuns] carry guns the way Londoners carry umbrellas." He adds that the "existence of and respect for the gun has reduced crime and kept order." While several accounts characterise the Pashtun (and indeed Baloch) groups as traditionally warring tribes (dating back to the Raj and earlier), their association with guns is a relatively more recent phenomenon. According to Abbasi (2013), the arrival of refugees from Pakistan as a result of the Afghan-Russian war in the 1980s was the watershed in terms of introducing a weapon culture in Pakistan. The unfettered movement of populations along the Afghanistan-Pakistan border also made any strict controls on weapons trade meaningless and as conflict spilled into Pakistan, the demand for and production of guns increased.

[69] For Middle-Class Pakistanis, a Gun Is a Must-Have Accessory. *The Wall Street Journal*. 6 January, 2009.

While very little (or next to no) published material is available on gun culture in Balochistan, informal accounts from several residents and experts whom I contacted suggest that guns are a vital part of Baloch tribal identity. In Punjab and Sindh, much like the other provinces, guns are likely to be owned by the rural elite. According to the Wall Street Journal article cited above, "urban Pakistanis tend to shun the illegal arms bazaars, in an areas known for tribal codes, bandits and Islamic[70] insurgents."

The concept of a 'gun culture' is not unique to parts of Pakistan, and has been studied in detail in several countries. Based on a detailed analysis of the gun culture in post-war Kosovo, and drawing on discussions on El Salvador, Georgia, Kyrgyzstan and Tajikistan, SAS (2005) concludes that gun-culture, being itself an outcome of historical and political processes, is erroneously identified as a cause of violent conflict; which in fact is a result of social, historical and political determinants. Further, gun cultures are not monolithic, and vary across age, gender, social status, and can also change over time. This is instructive while considering measures to reduce gun violence and indeed gun ownership in Pakistan, as it suggests that individual and group attitudes towards guns need not be immutable, and not necessarily at the cost of community identities.

Finally, it is important to consider how the prevailing security situation affects the demand for civilian gun ownership. When confronted with the possibility of being attacked by armed assailants, many civilians, particularly the rich (who are more likely to be victims of targeted shootings) may consider obtaining guns to get a sense of safety, as well as to defend themselves against potential shooters, if required. Guns therefore can be a vital security good in a context of rampant crime and physical insecurity to individuals and groups that are more likely to be targets of violence. Prior to adopting a policy to limit the number of new guns' licenses in 2013, the Government of Pakistan had in fact made it easier and quicker for traders and businessmen who were facing threats of extortion to obtain gun licenses for self-defence (Abbasi, 2013), indicating a

---

[70] The quotation above has been taken verbatim from the original source. The author would, as in other chapters of this thesis, prefer to use the terms 'Islamist' or 'Jihadi', to 'Islamic' while describing the insurgent groups' motivations.

tacit state approval of some forms of civilian militarisation as a means to respond to the threats of criminal intimidation and extortion.

5.3 Data Sources and Empirical Strategy

In order to examine the effects of aid receipts on the likelihood of gun acquisition, I specifically consider the Citizens Damage Compensation (CDCP) – Phase I transfer, an unconditional flood relief cash transfer paid by the Government of Pakistan to flood-affected households in the aftermath of the massive 2010 floods. The Phase – I transfer comprised a flat and one-off payment to each eligible house of PKR 20,000. Eligibility in Phase I was defined as (a) every household residing in a deemed "flood-affected" village/urban centre (subject to exceptions for households with a foreign bank account and having undertaken foreign travel) in Punjab, Sindh and Balochistan, (b) households identified as flood-affected based on a house-to-house damage assessment exercise conducted in Khyber-Pakhtunkhwa.

5.3.1 Data Sources

For my analysis I use the baseline cross-section of the CDCP Impact Evaluation dataset (OPM, 2013). This dataset is representative of areas affected by the 2010 floods in Pakistan, across the four major provinces: Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan. The dataset comprises 7802 households across 498 primary sampling units, including 448 rural, and 50 urban communities. The survey for the baseline of Phase II transfers was conducted during December 2011 – February 2012, after the rollout of the first phase of the CDCP flood relief transfer.[71] The survey comprised detailed questionnaires for male and female respondents at the household level, and a detailed community-level module.

Notably, the questionnaire included a question on whether or not the household owned any guns, and also whether or not the household held any guns prior to the 2010 floods. This allows me to analyse, in addition to the correlates of owning guns at all, any new

[71] The cross section serves as a baseline for Phase II of the CDCP transfers; it, however, contains retrospective questions on the receipt of CDCP Phase I transfers that I use for my analysis.

acquisitions of guns by households who did not possess guns before the 2010 floods in the period between the floods and the household survey, which coincides with the rollout of the CDCP Phase – I transfer. Further, the amount of the CDCP – Phase I payments (PKR 20,000) were sufficient to purchase any small, locally made guns (ranging from PKR 8,000 – PKR 20,000),[72] as well as to contribute substantially towards guns priced in the PKR 20,000 – 40,000 price range.

5.3.2 Empirical Strategy

5.3.2.1 Descriptive Statistics and Correlates of Gun Ownership

I propose to use descriptive statistics and simple probit estimates to examine the correlates of gun ownership in Pakistan. I include a range of household and community factors in the probit estimation of the likelihood of household gun ownership to identify variables that have statistically significant correlation.

5.3.2.2 Using Propensity Score Matching to identify the causal effects of Flood Relief cash transfers on the Likelihood of buying Guns

In order to identify the causal effect of the receipt of CDCP – Phase I transfers on the likelihood of purchasing guns, I restrict the analysis to households that did not possess any guns before the 2010 floods and then examine the effect of the cash transfer on the likelihood of purchasing a gun over the year following floods (i.e. anytime between the floods in 2010 and the household survey in December 2011 – January 2012). As the coefficient on the transfer receipt dummy in a simple probit estimation of the likelihood of gun purchase will be biased, owing to the endogeneity of gun acquisition and cash transfer receipts, and lacking a randomized experiment or a discontinuity in programme rollout, I attempt to identify the causal effect using Propensity Score Matching (Rosenbaum and Rubin, 1983).

The CDCP Phase I flood relief cash transfers were intended to be universal (subject to a few restrictive exclusion criteria) to all households in flood-affected villages in three of the four major provinces in Pakistan. In the fourth province, Khyber Pakhtunkhwa,

[72] Published sources for gun prices were not available; the prices mentioned here are based on estimates provided by Pakistani informants whom I interviewed

eligibility was determined based on a house-to-house damage assessment survey. In reality, however, not all households in the three large provinces, received the transfers owing to administrative delays, ineffective dissemination of information about the programme, cumbersome paperwork and bureaucratic procedures for accessing payment, travel, time and money required to reach centres of disbursement, corruption and extortion, and the lack of special arrangements for people with disabilities and women to access the transfers (UNHCR, 2011; Hunt et al., 2011; O'Leary et al. 2012). As such, close to 40% of the survey households (representative of all flood-affected areas of Pakistan in 2010 in the four large provinces) did not receive the flood relief transfers. The province-wise breakup of recipients and non-recipients is shown in Table 2 below.

Table 2. Share of recipients and non-recipients of CDCP – Phase I transfers in sample, by province (unweighted)

	Punjab	Sindh	KPK	Balochistan	Total
Non recipients	1,063	467	777	709	3,016
Recipients	1,262	1,719	987	818	4,786
% Recipients	54.28%	78.64%	55.95%	53.57%	61.34%
Total	2,325	2,186	1,764	1,527	7,802

In the absence of a randomized allocation of flood relief, or an exogenous cut-off-based discontinuity to determine eligibility, the coefficient on a dummy variable that indicates flood relief receipts in a simple probit estimation will not yield unbiased estimates of programme impact. One way to overcome this challenge is to use Propensity Score Matching to control for the effects of observable characteristics that determine programme selection (Rosenbaum and Rubin, 1983). The aim of this method is to create a score based on observable pre-treatment exogenous attributes of households in treatment and control groups to find (statistically) similar households in the alternate group. This is done by comparing cash transfer recipient (beneficiary/treatment) households with a matched set of non-recipient (non-beneficiary/control) households based on the (observable) determinants of selection. In this chapter I estimate a Covariate Balanced Propensity Score (CBPS), as propounded by Imai and Ratkovic (2014). As with any estimates based on propensity score matching, the method does not account for selection bias arising from unobservables. This remains a limitation of the subsequent analysis, even as I try my best to match on a wide variety of observable characteristics that are likely to be correlated with the leading unobservables that can introduce bias at the local level, such as political clout and connections. Programme impact estimates are then arrived at assuming that the non-observable determinants of selection also follow the distribution of the observable determinants of selection – such as wealth and linguistic identity, on which the matching is performed.

The covariates used for matching CDCP – Phase I receipt include correlates of flood exposure, household demographics, education, pre-flood wealth and living standards, ethnicity as a likely indicator of exclusion and sex of the head of the household. Table 3 below shows the covariates used for matching programme recipients with non-recipients. The full details of the probit regression underlying the estimation of the propensity score are presented in the following sub-section, 5.3.2.3.

Table 3. Indicators used for Propensity Score Matching for CDCP Phase I receipts

Dimensions	**Variables**
Demographics	Proportion of household in various age groups, household size, proportion of men in the household, age of household head
Long-term wealth	Acres of farmland, pre-flood livestock value, dummies for electricity, gas, landline connection, type of water access and toilet in household category, Mud House dummy
Occupation	Household runs non-agricultural enterprise, Landless households dummy
Education	No. of males and females in the household who can read
Ethnicity	(Proxied by) linguistic group dummies

Flooding exposure	Household and village-level flood exposure index, index of house damage due to flood
Other	Rural dummy, Female-headed household, Dummy for Household with drainage access, Number of rooms in the house, Owner-occupied house dummy

5.3.2.3 Covariate Balanced Propensity Score Calculation

Table 4 below presents the results from the estimation of the Covariate Balanced Propensity Score (CBPS) calculated for CDCP – Phase I receipts across the 7,802 sample households. The CBPS is an improvement over standard Propensity Score Matching as, in addition to estimating the likelihood of treatment status, it also optimises covariate balance – which means that any two observations with roughly the same propensity score are also similar in terms of the variables used for matching, and not the overall score alone (see Imai and Ratkovic, 2014 and Friedman, 2012 for a discussion).

Table 4. Estimation of Covariate Balanced Propensity Score Matching for CDCP – I Receipts. Probit Model Results.

Independent Variables	**Coefficient**	**z**
Flood Exposure Index (HH)	0.012	1.16
Rural (dummy)	0.089	1.48
Flood Exposure Index (Community)	0.070***	5.40
Share of HH 13 – 17	0.144	1.08
Share of HH 18 – 25	-0.638***	-6.66
Share of HH 26 – 40	-0.090	-0.80
Share of HH 41 – 60	0.382**	2.46
Number of Rooms	-0.005	-0.33
Acres of Farmland Owned	0.001	0.25
Household Size	0.022***	3.52
Age of HH Head	0.011***	9.07
Drainage access in House (dummy)	0.063	1.36
pre Flood Livestock Value	-0.000**	-2.18
HH owns non-agricultural enterprise (dummy)	0.018	0.42
Household Damage Severity Index	0.133***	5.76
No. of Men who can read	0.037**	2.40
No. of Women who can read	0.038*	1.89
Access to piped water (dummy)	0.091	1.38
Access to Hand pump (dummy)	0.269***	6.22
Access to tube well (dummy)	0.078	1.33

Female headed HH (dummy)	-0.391***	-7.24
Landless HH (dummy)	-0.133***	-3.60
Flush Toilet access (dummy)	0.134***	3.06
Dry Latrine access (dummy)	-0.076	-1.61
Gas connection (dummy)	0.113*	1.81
Electricity access (dummy)	0.217***	5.23
Landline Telephone (dummy)	0.124	1.14
Mud Floor (dummy)	-0.013	-0.31
Owner-occupied house (dummy)	0.260***	6.23
Sindhi	0.352***	5.12
Punjabi	-0.200***	-2.64
Balochi	-0.076	-0.77
Brahvi	-0.912***	-6.66
Pushtu	-0.190***	-2.64
Saraiki	-0.140**	-2.09
Hindko	-0.000	-0.00
Other Language	0.482***	2.69
Constant	-1.608***	-10.56
Number of observations	7785	
LR Chi-squared (37)	1280.26	
Prob. > Chi-sq.	0.0000	
Pseudo R-squared	0.1232	
Details of Propensity Score		
Sum of Weight	7785	
Mean	0.613	
Std. Dev.	0.192	
Variance	0.037	
Skewness	-0.500	
Kurtosis	2.623	

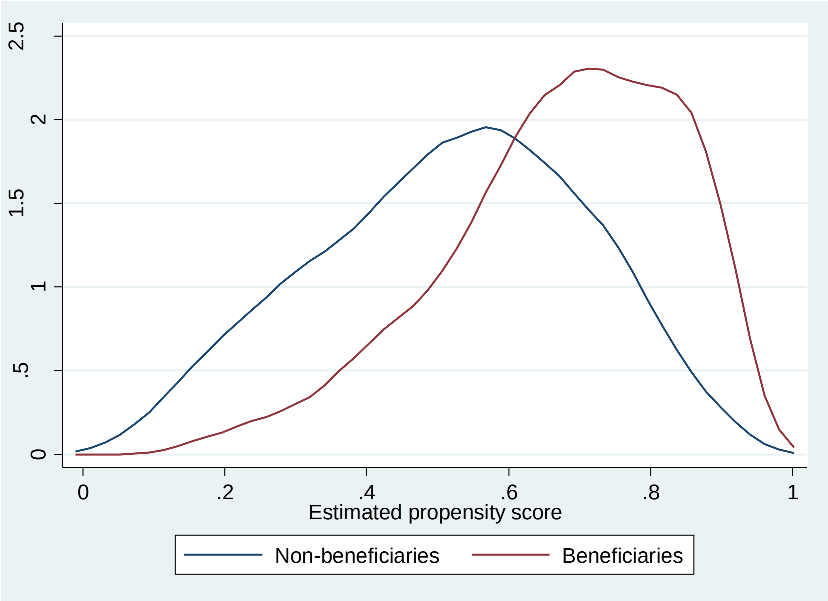
The Covariate Balanced Propensity Score (CBPS) was calculated using the 'pscore' command in STATA 13 software. This resulted in creating an optimal 13 blocks; the CBPS ensures that the balancing property of the Propensity Score is satisfied in every block. Table 5 below shows the inferior bound, and the number of treated and the number of controls in each block.

Table 5. Nos. of Controls/Treated in each Block for PSM

Inferior of Block of Propensity Score	Non-recipients (Control)	Recipients (Treated)	Total
0	34	12	46
0.1	57	8	65
0.15	94	29	123
0.2	279	96	375
0.3	374	218	592
0.4	489	394	883
0.5	289	298	587
0.55	294	377	671
0.6	296	494	790
0.65	245	529	774
0.7	388	1,078	1,466
0.8	155	1,004	1,159
0.9	22	249	271
Total	3,016	4,786	7,802

I use nearest neighbour matching, matching each treatment observation with the five control observations that have the closest propensity score as per the procedure outlined in Rao and Ibanez(2005) and Quisumbing *et al.* (2011). Dehejia and Wahba (1998) show that nearest neighbour matching provides results that are very close to those from random assignment. Figure 1 below depicts the kernel density of propensity scores for beneficiaries and non-beneficiaries, indicating considerable overlap and common support between the two to enable meaningful matching across the parameters listed above.

Figure 1. Kernel Density of Propensity Scores by Treatment Status



Programme impacts are measured as the Average Treatment Effect on the Treated (ATET) based on actual receipts of CDCP – I transfers, using nearest-neighbour matching (to the five closest neighbours).

5.3.2.4 Identifying Heterogeneous Programme Impacts

Finally, I test for any heterogeneous treatment effects from the Propensity Score Matching (PSM) across groups that may be more likely to use cash transfers to buy guns, and in conflict-affected and peaceful areas. I examine whether the receipt of cash transfers increased the likelihood of purchasing guns compared to a matched set of non-recipients among sub-populations that are generally wealthy, and/or less likely to have suffered substantial damages in the floods, and therefore likely to divert flood relief cash transfer receipts to non-material uses, such as guns.[73] Specifically I consider the following groups:

i. Communities that faced low levels of flooding exposure
ii. Households that were not exposed to any floodwater in the house
iii. Households that suffered no house damages in flooding

[73] I assume that the most deserving, i.e. severely flood-affected and poor households have pressing material needs, and may therefore be less likely to purchase guns.

iv. Medium and Large Farmer households (with land holdings of 1.5 acres or higher) – as groups that lack liquidity, and have to depend on cash transfers to acquire guns

Further, as the relative need or attractiveness of buying guns with money provided by cash transfers depends on the prevailing security situation, I additionally examine heterogeneous treatment effects within these sub-populations listed above, across conflict-affected and peaceful areas, based on the South Asia Terrorism Portal conflict events timeline (described in detail in Chapter 2).

Finally, for any groups for which flood relief cash transfer receipts increased the propensity of gun acquisition, I examine if this effect is explained by the amount of time spent displaced, in flood relief camps – as a factor that can potentially accentuate security concerns, and therefore the need for guns. I examine heterogeneous treatments effects for sub-populations with a propensity to use flood relief transfers to buy guns (identified as outlined above), across two groups: those who spent any time living in flood relief camps, and those who did not.

5.4. Results

5.4.1. Descriptive Statistics

5.4.1.1 Household Gun ownership

I first examine the rate of gun ownership in the sample from the flood-affected areas of Pakistan, at the national and provincial levels. Survey-weighted estimates of gun ownership in Pakistan from the sample show that 7.04 % of households in Pakistan reported owning a gun. This figure is as high as 28.82% for the Balochistan province. As reported in 2.3.1, Karp (2007) estimates that there are 11.6 guns per 100 people in Pakistan. Unfortunately, the survey data used for the present analysis does not contain information on the number of guns owned.

Table 6. Percentage of Households that own a gun (using sampling weights)

	Punjab	Sindh	KPK	Balochistan	TOTAL
HHs Own Gun	4.01%	8.05%	1.02%	28.82%	7.04%
HHs Do not own gun	95.91%	91.95%	65.22%	70.94%	87.64%
No Response	0.08%	0%	33.77%	0.24%	5.32%

Source: CDCP Baseline Survey, Dec 2011 – Jan 2012

The percentages reported in table 6 above are likely to be an under-estimate of true gun ownership, particularly in KPK where the reported rate of gun ownership seems much lower than previous accounts have suggested. The underestimation of gun ownership through surveys is largely because many households are unlikely to either misrepresent gun ownership status (claim they do not own guns, when in fact they do), or simply not respond to the question during the survey. While 7113 households (out of the total 7802 in the sample) responded to this question, 689 sample households (8.83%) either chose not to respond, or had no information.[74] Further, the exceptionally high rate of non-response to the question of gun ownership in KPK (nearly 34%) suggests that many households that probably own guns chose not to answer the question during the survey. This is interesting because they chose not to respond to the question on guns when they could have, in theory, very easily said they did not possess any guns if they did not want to admit to any possession of guns.

It is noteworthy that the majority of the households that did not respond to this question lie in the conflict-affected district of the KPK province. In three communities no household responded to the gun question; of which two lie in high conflict and one in medium conflict sub-districts. This merits further exploration. I later examine if non-response is systematically associated with any household and community characteristics, and with exposure to conflict.

In addition to non-response, the problem of misrepresentation (i.e. claiming not to possess guns when in fact the household does) is another source of gun ownership

[74] This is different from the figure on non-response in table 6 as the latter uses sample weights whereas here I only report the total number of sample households that did not respond to the question

under-estimation. Unfortunately these are real and intractable problems associated with any household survey-based approaches to estimating gun-ownership. Any survey-based analyses of gun ownership have to contend with these concerns, and are therefore likely to under-estimate true ownership.

A question in the household questionnaire asks whether or not the household possessed any guns prior to the 2010 floods, allowing an identification of households who possessed a gun at the time of survey (December 2011 – February 2012) but did not prior to the floods. These households acquired guns in the period following the floods and coinciding with the CDCP – I transfers. Of the total 777 households in the sample that possessed any guns at the time of the survey, 99 (12.7%) did not own any guns prior to the survey but acquired them thereafter (62 of these households were in Balochistan, 22 in Sindh, 8 in Punjab and 7 in KPK).

What household and community-level factors are associated with gun ownership? I now assess the correlates of household gun ownership using a simple probit model. In the following analysis I exclude all non-responses to the question on gun ownership. I examine the association of household gun ownership with demographic variables (household size, composition, number of males, gender of household head), education level (numbers of males and females with primary schooling), wealth status (land ownership, livestock ownership, enterprise ownership), access to drainage services, receipt of remittances, linguistic identity, and community characteristics (urban/rural status, topography, distance from administrative capitals and cantonments, index of presence of state institutions, community infrastructure, intra-community linguistic fractionalisation), and province dummies. Results are presented in Table 6 below.

I also attempt to examine the relationship between conflict exposure and gun ownership. As this is likely to be endogenous, I cannot claim a causal effect of conflict on gun ownership rates and therefore restrict the analysis to simple correlations. In previous chapters of this thesis I have presented causal effects of conflict on variables of interest using two specific instrumental variables: the distance to Afghanistan, and the share of the Pashtun population. Both these potential instruments are unsuitable for identifying the causal effect of conflict on gun ownership. First, as discussed in section 5.2.3.3, the distance to Afghanistan directly affects the availability (and probably the price) of guns – and therefore the likelihood of gun ownership. This is because many guns are manufactured close to the Afghanistan border, near Dara Adam Khel, and because guns are also smuggled in to Pakistan from Afghanistan. Secondly, the proportion of Pashtun population can also directly affect gun ownership due to cultural practices that have been created over time, which conflate gun ownership with notions of Pashtun identity. Lacking any strong instrument to overcome the endogeneity of conflict exposure and gun ownership, I only present simple probit estimates in table 6 below. In the first specification (column 1) I include a dummy variable for whether or not the community is located in a tehsil (sub-district) that witnessed any violent conflict between January 2001 and June 2010 as per the South Asia Terrorism Portal conflict events timeline for Pakistan (explained in detail in Chapter 2 of this thesis). I then also attempt to examine if gun ownership is associated with the distance to Afghanistan, being a correlate of both, exposure to conflict in the 2001-2010 period, and the availability of guns. The results from this estimation are presented in column 2.

Table 7. Correlates of Household Gun Ownership: Probit estimates

	(1)		(2)	
	Coefficient	z	Coefficient	z
Household Size	-0.001	-0.30	-0.000	-0.19
Urban	0.010	0.64	0.017	1.07
No. of males with primary Education	0.008**	2.34	0.007**	2.19
No. of females with primary Education	0.005	1.10	0.004	0.94
No. of HH members above 14	0.004	1.44	0.004	1.56
Value of livestock before floods (PKR)	0.000***	5.97	0.000***	5.85
Age of HH Head	0.000	1.27	0.000	1.26
Total number of Male members in HH	0.001	0.16	0.000	0.15
Female headed HH (dummy)	-0.021	-1.45	-0.021	-1.45
Landless HH (dummy)	-0.033**	-2.30	-0.032**	-2.28
Marginal farmer (<1.5 acres of land)	-0.022	-1.10	-0.022	-1.09
Medium Farmer (1.5 – 12.5 acres of land)	0.012	0.82	0.013	0.90
Large farmer (12.5 acres of land)	0.050**	2.21	0.049**	2.17
HH owns non-agricultural enterprise	0.012	1.27	0.013	1.34
HH has access to drainage	0.032***	2.81	0.030***	2.60
HH received remittance	0.004	0.27	0.005	0.39
Days spent in flood relief camp (displaced)	0.000	1.25	0.000	1.01
Distance from District Capital	0.003	0.15	0.006	0.38
Distance from Province Capital	0.008	1.24	0.000	0.04
Index of Linguistic Fractionalisation	-0.037	-1.41	-0.032	-1.24
Index of community-level infrastructure	-0.003	-0.94	-0.003	-1.06
Index of presence of state institutions at	0.001	0.91	0.001	0.67

community level				
Distance from nearest Army Cantonment	0.061***	3.08	0.052**	2.37
Topography: Inland Plain	0.065**	2.11	0.055*	1.65
Topography: Coastal Plain	0.050	1.33	0.033	0.85
Topography: Plateau	0.154***	2.99	0.145***	2.83
Topography: Hills	0.095**	2.36	0.073*	1.73
Topography: Valley	0.241***	5.41	0.217***	4.68
Topography: Mountain	0.141***	3.62	0.128***	3.13
Topography: Desert	0.039	0.83	0.052	1.02
Former princely state (dummy)	0.032	1.58	0.014	0.71
Nation Building District – At risk of radicalization	0.008	0.55	0.028**	2.00
Urdu	0.010	0.38	0.016	0.60
Sindhi	-0.029	-1.10	-0.018	-0.66
Pushto	0.111***	3.43	0.072**	2.06
Balochi	0.053*	1.81	0.057*	1.93
Hindko	0.106***	2.78	0.108***	2.92
Saraiki	0.021	1.13	0.021	1.08
Brahvi	0.034	0.85	0.030	0.74
Other Language	0.018	0.48	0.020	0.53
KPK	-0.069**	-2.24	-0.085***	-2.82
Sindh	0.112***	4.70	0.137***	5.81
Balochistan	0.172***	6.94	0.170***	7.09
Conflict-affected sub-district (dummy)	0.006	0.48		
Nearest distance to Af-Pak border			-0.032***	-3.83
N	7007		7007	
pseudo R^2	0.2119		0.2162	

Marginal effects; *t* statistics in second column
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Among household characteristics, we see that adult males' primary education, the number of members above age 14, households owning more than 12.5 acres of land, and access to drainage facilitiesare positively associated with gun ownership.

Households in communities that are further away from army cantonments, and that are located in valleys, plateaus, hills, and mountains are more likely to own guns. Pushto and Hindko linguistic identity, and Sindh and Balochistan provinces are also positively associated with gun ownership (relative to Punjabi speakers, and the Punjab province, respectively). The coefficient on the dummy for a conflict-affected sub-district in specification 1 is not statistically significant. However, we see that distance to the

Afghanistan-Pakistan border (indicating both, lower availability of guns and lower exposure to conflict over the 2001-2010 period) has a negative relationship with gun ownership (proximity, therefore has a positive association).

Finally we observe that the coefficient on the dummy for the KPK province is negative. This is contrary to some of the qualitative discussions and assessments of gun ownership in the province in 5.2.3.3. This is in large part probably because of the very high rate on non-response to the question on gun ownership in KPK, and possibly because those who own guns are in fact more likely to not respond to the question.

Is non-response systematically linked with household and community characteristics, and is it partly explained by exposure to conflict? I use a simple probit model to assess the correlates of household non-response to the question on gun ownership. I find that households that chose not to respond to this question were more likely to have fewer male members, but also more male members with primary or higher education. They were also more likely to have access to drainage– much like the households that own guns, from table 7 above. Every household in Sindh responded to this question (and therefore dropped out of the probit estimation), whereas, as the descriptive statistics in Table 6 suggest, households in KPK were much more likely not to respond. While the coefficient on the dummy for a conflict-affected district is not statistically significant, I find that the distance from the Afghanistan-Pakistan border has a significant, negative relationship, suggesting that areas closer to the border – which are more exposed to violence, and have easier access to guns – are more likely not to respond to the question on gun ownership. Interestingly, non-response has a strong positive relationship with the dummy for a Nation-Building District. These are districts identified by the Government of Pakistan as facing socio-economic backwardness and that are at a risk of growing radicalisation. The full results from the probit estimation are provided in Appendix 5.1.

These associations suggest that non-response is not entirely random. In fact, apart from the fact that residents of KPK are more likely not to provide a response, it appears that some of the factors associated with gun ownership (table 6) are also associated with non-response. This suggests that non-response may be more closely associated with gun ownership (as against with not owning guns). It follows that the extent of non-response to the question on gun ownership is likely to result in an under-estimation of the prevalence of gun ownership.

4.1.2 Correlates of the Community-level rate of gun-ownership

I now identify the correlates of the rate of mean community-level gun-ownership rates. I model the average rate of households that own guns in a community (the share of households in the community that owns at least one gun) as a continuous variable censored between 0 (no household owns a gun), and 1(every household owns a gun), based on Long (1997). Of the 498 communities in the sample, in 230, no households owned guns, in one community every household owned a gun, in three communities no household responded to the question, and for 236 communities the share of households that owns guns lies between 0 and 1. I find that community-level rates of household gun ownership are positively correlated with the share of households that own 1.5 acres or more of land, topography characterised by plateaus, mountains and valleys, the community being part of a Nation-Building District, described in 5.4.1.1 above, and with proximity to the Afghanistan-Pakistan border. On the other hand, Urban/rural status, distance from administrative capitals, the degree of linguistic fractionalisation and community-level infrastructure and the presence of state institutions have no significant relationship. The full Tobit estimation results are presented in Appendix 5.2.

5.4.2 Effect of Cash Transfers on Gun Purchases

I now examine whether the receipt of cash transfers, specifically the CDCP – Phase I flood relief cash grant of PKR 20,000, caused an increase in the propensity to acquire guns. In order to do so, I restrict the analysis to households that did not possess any guns before the 2010 floods, and then identify whether the receipt of the CDCP – I transfer increased the likelihood that the household purchased a gun sometime between the 2010 floods and the household survey in December 2011 – January 2012. This approach will only be able to identify any causal effect of the flood relief cash transfers on the extensive margin of guns' acquisition; lacking data on the number of guns owned by a household, I am unable to identify whether households that had guns prior to the 2010 floods, used the cash transfer to acquire more guns.

I first present simple probit estimates of the effect of CDCP – Phase I receipts on the likelihood of buying guns. In Table 7 below, columns 1 – 4 show the coefficient on the CDCP – Phase I receipt (dummy) on the likelihood of owning a gun at the time of the survey (for that part of the sample which did not own a gun before the floods), without any controls, and then sequentially adding province dummies, community controls and household controls, respectively. Columns 5 and 6 depict the coefficient from the estimation with full controls for the sub-samples of all no-conflict sub districts, and conflict-affected sub-districts, respectively.

Table 8. Effect of CDCP – Phase I receipt of Extensive Margin of Gun Acquisition between July 2010 and January 2012: Simple Probit estimates

	(1)	(2)	(3)	(4)	(5) No-Conflict tehsils	(6) Conflict-affected tehsils
CDCP – Phase I transfer received (dummy)	-0.000	0.001	0.006	0.004	0.004	0.003
	(-0.04)	(0.42)	(1.56)	(1.15)	(0.72)	(0.52)
Province Dummies	-	Y	Y	Y	Y	Y
Community Controls	-	-	Y	Y	Y	Y
HH Controls	-	-	-	Y	Y	Y
N	6326	6326	6123	6031	3370	1899

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Community and Household controls same as those included in Table 7

Table 8above shows no significant relationship between the receipt of the CDCP – Phase I transfer and the acquisition of guns, even after including controls, and in conflict-affected and peaceful areas. Interpreting the coefficient on the CDCP – Phase I dummy above as a measure of the Average Treatment Effect on the Treated (ATET) would however, be inaccurate as the simple probit estimation would suffer from selection bias.

Households more likely to receive the cash transfer (the treatment) may also be less inclined or able to purchase guns due to many observable and unobservable factors.

In order to reduce the extent of the selection bias to arrive at a more accurate estimation of the ATET, I use Propensity Score Matching. This technique allows me to eliminate any such selection bias arising from a wide array of observable factors that may be confounded with treatment status, as well as any unobservable factors that are closely associated with the observables on which I match cash transfer beneficiaries with non-beneficiaries. Having described in detail, the procedure for generating a balanced Propensity Score based on the wide array of observables that determine selection in section 5.3.2.2 and 5.3.2.3, I now present ATET estimates of the CDCP – Phase I transfers on the likelihood of gun acquisition for the full sample, and then for no-conflict, and conflict-affected areas, respectively.

Table 9. PSM ATET estimates of CDCP – I on the Extensive Margin of Gun Acquisition between July 2010 and January 2012

	Full sample	No-Conflict tehsils	Conflict-affected tehsils
ATET			
CDCP – I	0.003	0.002	0.007
	(0.95)	(0.66)	(1.46)
N	6314	4203	2111

Marginal effects; *t* statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Again, we see that the CDCP – Phase I cash transfer has no significant effect on the likelihood of guns' acquisition among the population at large, in both conflict-affected and peaceful areas. This is not particularly surprising as flood-affected populations are very likely to use cash for rebuilding their lives, restoring assets, paying for medical expenses etc. Acquiring a gun may be a low priority for the general population in such a situation, and as table 9 above shows, even in conflict-affected areas.

5.4.3 Heterogeneous Treatment Effects: Across Groups More likely to divert Cash Grants to Gun Purchases

Aggregate treatment effects, such as those estimated in Table 8 above, may often mask heterogeneities across sub-groups of the population for whom treatment effects may be more pronounced and significant. While households that are most affected by floods may use the flood relief transfers for rehabilitation, those households that are not much affected, or that have a greater capacity to limit and withstand flooding shocks, or those that face graver security threats and whose security needs may be more pressing than their material requirements, may be more likely to divert cash relief towards acquiring a gun.

I therefore focus attention on households/groups that are not likely to have been much affected by the floods, those who have a better ability to face flooding shocks, and those that are likely to face security threats in a post-flood setting to examine if the provision of cash transfers to such groups can (unintentionally) result in increased gun acquisition. I specifically consider the following types of households:

i. Households that faced no flood water exposure in their homes (even if others in their community were flooded). This is based on self-reported levels of the depth and duration of flood waters in the dwelling.
ii. Households in communities that faced low levels of flooding on the whole (low exposure, and therefore lower material losses). This pertains to communities with a low Flood Exposure Index, i.e. < 1, as described in Chapter 6 (on Floods and Migration)
iii. Households whose houses suffered no physical damage in the floods (again, low exposure, and material loss), based on self-reported house damages in the survey; and finally,
iv. Farmer households with land holdings of 1.5 acres and above – who are better able to withstand flooding shocks (compared to the landless and marginal farmers), may lack the necessary cash to purchase guns without transfer receipts (as their wealth is in the form of large, immobile assets), and who may face greater security threats.

In tables 10 – 13 below, I present the ATET estimates of the impact of the CDCP – I on the extensive margin of gun acquisition within the four sub-groups listed above, and across no-conflict and conflict-affected areas.

Table 10. PSM ATET estimates of CDCP – I on the Extensive Margin of Gun Acquisition between July 2010 and January 2012: Households that faced no Flood Water exposure in their homes

	Full sample	No-Conflict tehsils	Conflict-affected tehsils
ATET			
CDCP – I	0.009	0.023**	-0.004
	(0.68)	(2.02)	(-0.18)
N	817	352	465

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11. PSM ATET estimates of CDCP – I on the Extensive Margin of Gun Acquisition between July 2010 and January 2012: Communities with low Flooding Exposure (Flood Exposure Index < 1)

	Full sample	No-Conflict tehsils	Conflict-affected tehsils
ATET			
CDCP – I	0.010	0.000	-0.013
	(0.69)	(.)	(-0.66)
N	676	203	473

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12. PSM ATET estimates of CDCP – I on the Extensive Margin of Gun Acquisition between July 2010 and January 2012: Households that reported No Housing Damages in the floods

	Full sample	No-Conflict tehsils	Conflict-affected tehsils
ATET			
CDCP – I	0.017	0.000	-0.054
	(1.18)	(.)	(-0.97)
N	267	153	114

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13. PSM ATET estimates of CDCP – I on the Extensive Margin of Gun Acquisition between July 2010 and January 2012: Households with land holdings of 1.5 acres or higher

	Full sample	No-Conflict tehsils	Conflict-affected tehsils
ATET			
CDCP – I	-0.006	-0.010	0.083***
	(-0.84)	(-1.23)	(3.81)
N	1193	838	355

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

From tables 10 – 12 above it appears that the CDCP – I transfers did not have any significant effect on the propensity to purchase guns among sub-populations that faced lower degrees of flooding exposure and damage, in both conflict-affected and peaceful areas (column 2 in table 10 being an exception, showing a small but surprising positive effect of the transfer on gun purchases among households that were not flooded and were in no-conflict areas). This suggests that the provision of cash to groups that are likely to have faced lower material losses due to floods, in general, is not likely to lead to any civilian militarization through the purchase of guns. However, we see in table 12 that the receipt of CDCP – I transfers among large land owning households in conflict-affected sub-districts increased the likelihood of gun purchase by 8.3%.

Do security concerns explain why large land owning households in conflict-affected areas are more likely to use flood relief cash transfers to acquire guns?

Large land owning households, who may be better able to protect basic consumption levels even when their homes and lands have been badly affected by floods and thus have less pressing material needs from a survival standpoint. Such households may have a higher relative preference for buying guns from the receipt of a cash transfer, not only because their material requirements are less pressing, but also because they may face higher security threats, including armed robbery, theft and looting (Semple, 2011). More likely to be made the targets of attack in conflict-affected areas, large land-owning households may use the infusion of cash to enhance their security by acquiring a gun. Furthermore, large land-owning households in Pakistan are often characterized by asset portfolios dominated by illiquid assets such as land. Despite having high levels of wealth, such households may have low levels of cash income, and may therefore acquire guns in the face of security threats only after any exogenous increases in cash holdings (through flood relief transfers).

It is not possible to observe the specific sense of vulnerability, or the threats faced by such households. However, as many observers, including Semple (2011) have identified, living in flood relief displacement camps, both official and unofficial, presented heightened security threats to several households. During the period of displacement, households felt vulnerable in the camps which in some cases experienced criminal activity including extortion, armed attack and robbery, as well as because they feared that their homes and properties back home were being looted while they were in the camps. Residence in a flood relief camp can therefore be seen as a factor that enhances household vulnerability, including for the large land owning households who may have more to lose, both in the camp (where they probably were able to bring more liquid assets with them), as well as in their communities where they risked the plunder of their homes and assets. I therefore examine if the positive effect of the CDCP – I transfer on gun purchases among large land owning households in conflict-affected areas varies by the duration of time spent by such households in displacement camps.

Table 14. PSM ATET estimates of CDCP – I on the Extensive Margin of Gun Acquisition between July 2010 and January 2012: Households with land holdings of 1.5 acres or higher in Conflict-affected tehsils – by Flood relief camp status

	All Conflict-affected tehsils	Conflict-Affected tehsils: HHs did not live in flood relief camps	Conflict-Affected tehsils: HHs lived in flood relief camps
ATET			
CDCP – I	0.083***	-0.089	0.057***
	(3.81)	(-0.93)	(2.91)
N	355	147	205

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14 above suggests that the positive effect of CDCP – I on gun purchase among large land owning households in conflict areas is significant only among households that were displaced and lived (for any duration of time) in flood relief camps. There is no such effect for households that were not displaced (and therefore probably faced lower physical insecurity). While the decision whether or not to move a flood relief camp could itself be driven by unobservable characteristics that are correlated with cash transfer receipts and that also determine gun purchase, it is not intuitively clear what such factors may be. Apart from the possibility of such a variable (that I have not been able to countenance) driving the result of the association of displacement status and gun purchases, table 14 above provides some suggestive evidence that cash transfers can lead to greater acquisition of guns in a manner explained partly by the insecurities associated with displacement and living in a relief camp. Specifically, this may happen when (i) households do not face grave material deprivations (as would be expected for households with large land ownings), (ii) they face higher security risks (indicated by living in conflict affected areas, and having undergone temporary flood-induced displacement in to flood relief camps), and (iii) may have relatively lower cash holdings with which to acquire guns (which makes the role of extraneous cash transfers, rather than income, critical in explaining why guns may be purchases out of transfer receipts, rather than income).

5.4.4 Robustness Check

I examine whether the results obtained above are robust to an alternate estimation of the covariate balanced propensity score. I do so by matching programme recipients with non-recipients only among the category of medium and large farmers (the sub-groups for which the cash transfer appears to have a positive and significant effect on the likelihood of gun purchases) who did not own guns prior to the 2010 floods. Further, while the previous CBPS estimation included a large number of covariates. I now use a more parsimonious specification, and test whether the results presented above also hold when (i) matching is done only within the category of large land-owning households, and (ii) using a more limited set of covariates. I match recipient and non-recipient large land-owning households on the following characteristics: rural/urban residence, household size, age of household head, number of males and females in the household who can read, farmland owned, pre-flood value of livestock, household flood exposure index, household social capital measure, and province of residence.

The probit estimates of the calculation of the covariate balanced propensity score, and the graphical depiction of the kernel densities of the propensity score for beneficiaries and non-beneficiaries are presented in Appendix 6.3. I now present estimates of the Average Treatment Effect on the Treated based on nearest neighbour matching using the Covariate-Balanced Propensity Score described above (matching each treatment household to five control households with the closest propensity score). I first present ATET estimates for all large land-owning households, in peaceful and in conflict-affected areas (table 14), and then examine whether any effect of the treatment is driven by households that were living in displacement camps (table 15), to examine if the results in Tables 13 and 14 are robust to matching based on a more parsimonious set of covariates.

Table 15. PSM ATET estimates of CDCP – I on the Extensive Margin of Gun Acquisition between July 2010 and January 2012: Households with land holdings of 1.5 acres or higher – Only large farmer households not owning guns pre-2010 floods matched on a smaller set of covariates.

	Full sample	No-Conflict tehsils	Conflict-affected tehsils
ATET			
CDCP – I	0.011	0.012*	-0.000
	(1.60)	(1.90)	(-0.02)
N	1193	838	355

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 16. PSM ATET estimates of CDCP – I on the Extensive Margin of Gun Acquisition between July 2010 and January 2012: Households with land holdings of 1.5 acres or higher in Conflict-affected tehsils – by Flood relief camp status – Only large farmer households not owning guns pre-2010 floods matched on a smaller set of covariates

	All Conflict-affected tehsils	Conflict-Affected tehsils: HHs did not live in flood relief camps	Conflict-Affected tehsils: HHs lived in flood relief camps
ATET			
CDCP – I	-0.000	-0.010	0.058**
	(-0.02)	(-0.29)	(2.07)
N	355	147	205

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Matching within a smaller population (large and medium land owning farmers who did not own guns prior to the 2010 floods) and using a more parsimonious set of covariates for matching, I find that overall, the CDCP – I does not significantly increase the purchase of guns, neither for the sample from all areas, nor in conflict-affected areas alone. However, when I examine treatment effects within conflict-affected areas by households' displacement experience (as in Table 14), I find that the CDCP – I led to a 5.8% increase in the likelihood of acquiring a gun among households with 1.5 acres or more of land owning who were displaced temporarily by the floods. Although these results are based on matching on a smaller set of covariates, this provides a confirmation of the central findings in the main results: that the overlap of general material non-vulnerability (indicated by large land ownership), and high physical vulnerability (indicated by living in a conflict-affected area and in displacement camps following the floods, and possibly enhanced by household wealth) can induce households to use exogenous increases in disposable income, via cash transfers, to purchase guns.

5.4.5 A Note on External Validity

The above results are based on a sample representative of the flood-affected areas of Pakistan in 2010, at the national and provincial levels. While much of Pakistan was affected by flooding in 2010, and thus comprised the sampling universe for the survey, the results here are snapshot only of the flood-affected areas of Pakistan.

Secondly, disaster relief cash transfers, and the CDCP – I in particular are different from other types of cash transfers. The CDCP – I is a specific kind of cash transfer that was a one-time, lump-sum cash grant paid to beneficiaries who were chosen on the basis of very basic criteria– which creates a more diverse intended beneficiary profile, compared more tightly targeted programmes. This wider intended beneficiary profile, and the lack of conditionality creates the possibility of the diversion of transfers to groups that may have lower material deprivations, even in the aftermath of floods. The findings from the analysis of treatment effects of this programme therefore need not apply to means/Proxy Means-tested, more closely targeted programmes, or to conditional cash transfers.

Thirdly, the amount of money transferred in the CDCP – I (PKR 20,000 per recipient household) was substantial enough to enable the purchase of guns. Other cash transfer programmes such as the Benazir Income Support Programme in Pakistan, provide smaller amounts of income support in cash (PKR 1,000 – 1,200 per month), which may make the diversion of funds for purchasing guns less likely (assuming a low preference for forgoing current consumption for accumulating money over months to buy guns).

Yet these results speak to wider debates on the relationship between cash transfers and civilian militarisation. First, its focus on post-disaster aid addresses a wide audience interested specifically in complex emergencies and aid, distinct from regular social protection programmes. Also, this chapter has sought to identify potential routes through which disaster relief and cash transfers can (unintentionally) lead to increased purchases of guns. The results suggest that for populations for whom material deprivations are low, but security concerns are high, unconditional cash transfers may be used to boost security – in the present case, through purchases of guns. This mechanism may be applicable across a number of empirical contexts.

5.5. Summary and Conclusions

This chapter sought to identify the extent and the correlates of household and community-level gun ownership in Pakistan, and then examine if flood relief cash transfer receipts, the CDCP – I , increased the propensity of household acquisition of guns.

At the household level, I find that gun ownership is correlated with large land holdings and access to in-house drainage, the number of male members with primary or higher schooling, and with communities that are situated in plateaus, mountains and valleys, and that are further away from army cantonments. Households closer to the Afghanistan-Pakistan border, who were exposed to higher levels of violent conflict over the decade of the 2000s and who also have closer access to locally produced guns and those smuggled from Afghanistan, are more likely to possess guns. It appears that gun ownership is associated with higher wealth and social status.

These results are based on available responses from a household survey, in which about 34% of respondents in Khyber Pakhtunkhwa did not respond to the question on guns. It appears that non-response, particularly in Khyber Pakhtunkhwa is determined by many of the factors that are also associated with gun ownership, suggesting that non-response is likely to in fact mask gun ownership. The descriptive statistics on gun ownership (7.4% of all households possess at least one gun) is therefore likely to be an under-estimate.

At the community level I find that the share of households that own guns has a significant association with the share of large land-owning households, topography dummies for plateaus, mountains and valleys, the dummy variable for Nation Building districts – that are socio-economically backwards and face a risk of greater radicalisation, and proximity to the Afghanistan-Pakistan border.

On the relationship between cash transfer receipts and gun purchases, I find that there is no significant effect of cash transfer receipts on gun purchases, in both, conflict-affected and peaceful areas. Overall, rolling out cash transfers does not appear to have increased the rate of civilian gun ownership at the extensive margin.

Disaggregated analysis, however, shows that for households with land holdings of 1.5 acres and above (indicative of higher security threats, lower pressing material deprivations, and lower liquidity), and residing in conflict-affected sub-districts, the receipt of flood relief cash transfers significantly increased the likelihood of buying a gun (by households that did not possess guns until the 2010 floods) by 8.3%. This effect of the cash transfer appears to be related to the experience of living in a flood relief camp, which I interpret as a sign of heightened security concerns. I conclude that the among wealthy households who face low material deprivations, have lower holdings of cash and other liquid assets, and who may face security threats in terms of attacks, thefts, looting and extortion, cash transfers may be used to beef up their (assurance of) own security by acquiring guns. This result suggests one possible mechanism through which aid may unwittingly increase civilian militarisation (although this is not observed at the aggregate level): for the wealthy who may be materially well of but face (or perceive) physical dangers, the marginal utility from security goods such as guns may be more attractive than that from other assets or heads of expenditure. The exogenous infusion of cash, through disaster aid relief, then only provides the necessary liquidity to increases the expenditure on security goods, translating into higher likelihood of wealthy households acquiring guns.

The findings provide a few preliminary insights for policy. First, the large unconditional cash transfer-based flood relief programme in Pakistan did not lead to any increases in civilian gun purchases on the whole. Unconditional cash transfers therefore can be used effectively to provide post-disaster relief, without an exaggerated fear of them leading to higher civilian militarisation, through recipients’ purchases of guns. However, I also find some indicative evidence of the transfers increasing the propensity to buy guns, among land-wealthy households in conflict-affected areas. In order to circumvent such a possibility in future interventions, policy must address two aspects. First, given that the higher likelihood of large land-owning households in conflict-affected areas using cash transfers to acquire guns is in fact caused by security concerns, particularly security concerns in flood relief camps, the government must ensure that basic law and order is maintained even in a post disaster setting. This could potentially deter the need for the private provision of security and enable even the wealthy recipients to use cash transfers for making productive investments instead. Secondly, the targeting of cash transfers can be made tighter in conflict-affected areas to potentially exclude some wealthy households, who may not be much worse off, materially, without the transfers – if the aim is to ensure that aid money does not increase civilian militarisation.

This analysis is based on data which suffers from certain limitations. The high rate of non-response to the question on gun ownership, particularly in Khyber Pakhtunkhwa, and the absence of data on the number of guns owned by households before/ after the floods are critical limitations. The high-rate of non-response in the Khyber Pakhtunkhwa province may itself be an outcome of perceived security threats – a factor that can potentially motivate gun purchases. It is likely therefore that many non-response households may in fact have acquired guns – before or after the floods. Even if non-response households were more likely to possess guns (than not, as suggested by Appendix 5.1) it is not clear whether they were acquired before or after the 2010 floods. Therefore, it is not clear whether the exclusion of such a high number of households from the sample due to non-response is likely to result in an upwards or downwards bias in the ATET (a significant, positive ATET among large landowning households in conflict-affected areas, and who resided in flood relief camps). Secondly, the absence of data on the number of guns possessed by households before/ after the floods can potentially underestimate any positive impact of flood relief on gun purchases as the analysis misses out households who purchased additional guns following the 2010 floods. Thirdly, the numbers of households that acquired guns since the 2010 floods is relatively small (at 99). All these factors mean that the findings and conclusions from the analysis, discussed below, should be treated with considerable caution. The results should also be used as starting points for future research that is based on more detailed and complete information on gun ownership in Pakistan.

Chapter 6. On the Off-Chance: Flood Anomaly and Short-term Migration in Pakistan

ABSTRACT: While many studies have focused on the occurrence and intensity of natural disasters as triggers of migration, the effect of the frequency and predictability of natural disasters has been largely ignored. I exploit variation in the community-level intensity of exposure during the 2010 floods in Pakistan and develop a proxy measure for the likely past exposure to flooding shocks. I find that, controlling for the intensity of flooding exposure, more anomalous flooding reduces the household and individual propensity to migrate in the year following the floods. This result is consistent with the idea that populations that face recurrent flooding are more inclined, prepared, or able to migrate when hit by a flood than populations facing more anomalous flooding. As a consequence, migration is more likely to be used after a disaster in commonly hit areas. The results are robust to the inclusions of an array of controls, including access to flood relief transfers.

> "Reports that say that something hasn't happened are always interesting to me, because as we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns -- the ones we don't know we don't know. And if one looks throughout the history … it is the latter category that tend to be the difficult ones."

Donald Rumsfeld, US Secretary of Defense, 12 February, 2002[75]

6.1 Introduction

Migration is an important and a commonly observed coping strategy for households affected by natural disasters and other shocks (Sen, 1981; Fafchamps, 2003; Black et al., 2011; Bohra-Mishra et al., 2014; Gray and Bislborrow, 2013; Hunter et al., 2013; Marchiori

[75] Defense.gov News Transcript: DoD News Briefing – Secretary Rumsfeld and Gen. Myers, United States Department of Defense (defense.gov)". At: http://www.defense.gov/transcripts/transcript.aspx?transcriptid=2636

et al., 2012). A large number of studies (reviewed extensively by Belasen and Polachek, 2013; Drabo and Mbaye, 2011) show that both short and long-term migration increase in response to natural disasters and that household members' education, access to social networks and the availability of cash and credit for financing migration enable households and individuals to migrate in the aftermath of natural disasters.

Migration responses to natural disasters therefore depend partially on the availability of resources that households can, intentionally or otherwise, be prepared to deploy when disaster strikes (Stark and Bloom, 1985). The importance of such explicit preparation or the pre-positioning of resources, or of the higher ability of some households to expend such resources highlights the role of household agency in migration responses to shocks, rather than viewing migration as a direct and unmediated consequence of natural disasters. It follows then, that the anticipation of disasters can enable households to be better prepared to respond, including through migration, at their onset and as they unfold. To the extent that anticipation and preparedness depend on the past exposure to, or the recurrence of such shocks, *ceteris paribus* communities and households with lower past exposure to shocks such as flooding may have a lower propensity to migrate in its eventual aftermath, compared to communities and households that face such shocks more often. While studies have focused on the relationship between shock severity and migration, the migration effects of shock rarity has not received as much attention.

This is a glaring gap for both analytical and policy reasons. First, it implies that we do not sufficiently understand any underlying heterogeneity in the level of adaptive and risk-mitigating abilities between populations with varying historical exposure to some shocks. This is particularly important when such adaptive capacities are developed in response to, or from the experience of prior shocks. The recurrence of some shocks may also alter households' subjective and relative preference of coping strategies. In other words, the perceived welfare benefits of pursuing a particular coping strategy may itself be determined by the level of shock-anticipation, which in turn is based on past exposure.

From a policy perspective, recognising the more constrained ability of households to respond to a completely unforeseen shock can enable governments and other actors to focus specific attention to areas affected by more unprecedented shocks. In a setting characterised by an unprecedented shock, public policy must additionally account for households' lower preparedness, and therefore ability to respond on their own, through self-insurance and group-based insurance mechanisms[76] that are more common in areas of recurrent shock exposure. Further, an understanding of how the relative preference of alternate coping strategies may vary in areas with high/low frequency of shocks can suggest variations in the design of public policy interventions. For example, in areas of recurrent drought where populations are more likely to be more mobile and have well-developed seasonal migration patterns, aid can be disbursed centrally at locations where households are likely to migrate to, rather than in source villages. In other areas that are reeling under completely unprecedented drought however, households may not be able or willing to leave their homes and may need to be reached in their villages, and programmes such as in-village public works may be more suitable compared to in villages where populations are more likely to move out. Recognising such differences in coping response across areas with varying histories of flood exposure can therefore enable better targeted and more effective policy responses to support households that are coping with loss and damages.

Against such a background, we should expect that controlling for the degree of flooding exposure, households and individuals with low past experience of floods will be less prepared and possibly also less inclined – and therefore less likely to migrate in the aftermath of floods. Since the propensity to migrate also varies by households' and individuals' demographic, occupational and educational characteristics, and between rural and urban areas, it is also important to consider whether the effect of past flood exposure on migration decisions varies across demographic and rural/urban groups.

Finally, it is not clear whether *ceteris paribus*, and conditional on migrating at all, whether the degree of flooding anomaly may cause individuals and households to migrate to nearby areas as they may lack the wherewithal to undertake longer distance migration,

[76] Which, in turn, are based on some positive (even if incomplete) expectations of disasters

or alternatively it may cause them to migrate further away. The latter may be the case when populations that are otherwise reticent and unable to migrate do decide to do so, undertake more drastic and long-distance movement. Alternatively, it could be because areas with more recurrent flooding have over time, been better able to develop and identify nearby places to migrate to in the aftermath of floods, to avoid long-distance, and therefore costly and more insecure (owing to greater distance from an uninhabited or unsupervised home and hearth) episodes of migration mainly to escape flooding.

No studies, to the best of my knowledge, have examined these questions, or more broadly, the effects of the degree of shock anomaly on post-shock migration decisions. The academic literature has focused on disaster risk at the expense of uncertainty – a concept defined and explored in some detail later, representing the degree to which shocks are familiar (or alternatively more unknown) to households, depending on past exposure. I seek to address these conceptual and empirical gaps in the literature. Exploiting variation in the community-level extent of flooding intensity as well as in likely past exposure of such flooding during the massive 2010 floods in Pakistan, I attempt to distinguish the effects of flooding intensity and flooding anomaly on household migration decisions.

In this chapter, I define migration as any movement(s) by (an) individual member/s of a household to a destination outside their community for a period of one month or longer (including those who may have returned after at least one month away) since June 2010 (the onset of the floods).

Further, I define flooding anomaly as the extent to which the 2010 floods were likely to be of a surprise (as against of a routine) nature, in terms of the departure from the likely flooding exposure in the past.[77] **I also posit that more anomalous flooding represent a greater degree of uncertainty as households would be less familiar with the risks and coping responses associated with anomalous adverse events compared to more recurrent ones.** With this working definition in mind, I examine how household,

[77] I describe how I operationalise this definition and measure the extent flooding anomaly in Section 6.4, in detail

and individual level short-term migration respond to both, flooding intensity and flooding anomaly and set out to answer the following questions:

(i) Controlling for flooding exposure, how does the degree of flooding anomaly affect household and individual migration?

(ii) For which groups of households and individuals (rural/urban, occupational and demographic categories) are migration decisions more responsive to the degree of flooding anomaly? (In other words, are the effects of flooding anomaly on migration heterogeneous across groups?)

(iii) Does the degree of flooding anomaly affect the choice of migration destination (rural/urban, and in terms of distance from community of origin)?

I also attempt to examine what factors may explain *how* more anomalous flooding affects post-flood migration.

I find that the degree of shock anomaly, hitherto ignored, is indeed an important factor in the understanding on natural disasters and migration. I develop a unique means to proxy the likely past exposure to floods, and therefore the degree of flood anomaly in 2010. I then use a probit model to examine the effect of flooding anomaly and flooding severity on the propensity of households and individuals to migrate at any time during the year following the onset of the 2010 floods. I find that while flooding severity increases household and individual migration, flooding anomaly reduces migration at both levels. This negative effect is particularly driven by rural, landless and owner-cultivator, and male-headed households, but does not vary across individuals' gender, age and educational characteristics. The findings are robust to controlling for access to flood relief transfers, province-specific factors, and a range of household and community-level controls, including pre-flood characteristics that determine the degree of flooding exposure and flooding anomaly. I speculate that the recurring exposure to shocks enabled households to anticipate their onset and pre-position material and non-material resources that can enable migration; the absence of such exposure left households facing anomalous flooding less prepared and also possibly less inclined to migrate when the floods did strike. I find some descriptive clues to suggest that instead of migrating, such households were more likely to rely on remittances and debt to cope. Beyond its visible, strongly negative effect on the propensity to migrate alone, flooding anomaly can therefore potentially also determine the relative (and indeed revealed) preference of alternate coping strategies. These findings illustrate how household responses to natural disasters may vary by the extent of uncertainty of shocks, represented by how anomalous such shocks may be.

This chapter is organised as follows: Section 6.2 reviews the literature on the links between natural disasters and migration. Section 6.3 introduces the context of the 2010 floods in Pakistan. Section 6.4 describes the data sources and outlines the identification strategy, including the construction of indices used to measure flooding exposure and flooding anomaly. Section 6.5 presents empirical results for questions i – iii and Section 6.6 concludes with a summary of the findings.

6.2 Natural Disasters and Migration: The Evidence so far

6.2.1 Migration as a Coping Strategy

A vast number of studies has examined how households adapt and alter their economic behaviour in response to risk, adopting a combination of strategies. Fafchamps (2003) propounds a classification based on the timing of the strategies pursued, and how risk is shared; classifying strategies as risk reducing (ex-ante), self-insurance (through accumulation and sales of assets) and risk-sharing (within a group).

Following the theoretical classification of risk coping strategies outlined by Fafchamps (2003), migration, in particular, can be seen as a means of both, reducing exposure to shocks, for example by migrating out of areas (in times) where the incidence of shocks is high/expected (e.g. Indian workers migrating to Myanmar during the Indian monsoons: Satyanarayana, 2001), or alternatively as an ex-post risk coping strategy, where migration is undertaken for wage employment to compensate the loss of income due to the occurrence of the shock. In the latter case households and individuals may undertake temporary or longer-term migration to secure household consumption and well-being levels in the aftermath of shocks. Sen’s (1981) seminal work on famine discusses how the 1973 drought in Ethiopia, led several male members of households to migrate in search of wage employment. Migrating in order to increase labour income, or seeking wage employment is also a possible strategy in response to idiosyncratic shocks in the agrarian context. For instance, Kochar (1999) shows that in rural India labour market participation allows for risk mitigation following weather shocks. Some types of migration that follow a natural disaster may in fact help households reduce their continuing exposure to sources of duress. People may often migrate in order to wait out the effects of the natural disaster and possibly return when the worst phase is over, even if the situation has not returned to the previous normal (Belasen and Polachek, 2013). In other cases, migration after a natural disaster can help diversify household income (Stark and Bloom, 1985), particularly if land, assets or other sources of income have been destroyed by the disaster to create new economic opportunities following a loss.

Migration can also arise from a risk-sharing motive, whereby households divide members across space to enable some members to help others when they are differently subject to shocks (Rosenzweig and Stark, 1989). Typically, in many rural households some family members migrate to urban areas, both within the country and abroad, or to plantations or mines, and support family members left behind in the villages of their origin. The role of remittances in enabling households to diversify income, hedge risk, and smooth consumption has been examined in great detail by several scholars (De and Ratha, 2012; World Bank, 2006; Alderman and Garcia, 1993; Adams and He, 1995). Even as remittances may not fully compensate the losses suffered by recipient households as a result of shocks (as shown by Fafchamps and Lund, 2003), the support they extend to recipient households is critical. This effect of remittances remains an important motivation for migration, in the immediate aftermath of shocks, and also as a broader strategy to insure against future shocks.

The salience of migration as a strategy to cope with natural disasters is amply underscored in the empirical literature. Based on a meta-analysis of existing studies, both causal and descriptive, Belasen and Polachek (2013) conclude that natural disasters lead to short-term, and potentially longer-term out-migration. They also find that studies suggest that rural populations are less mobile in the aftermath of natural disasters.

6.2.2 Factors that link Disaster Exposure and Post-Disaster Migration

A review of the literature on natural disasters and migration suggests that several factors mediate the link between natural disasters and migration. These include:

6.2.2.1 Intensity: The effect of natural disasters on migration depends not only on the incidence of natural disaster exposure, but also the intensity of exposure. Gray and Muller (2012) and Meze-Hausken (2006) find that in the case of Ethiopia household migration increased with the intensity of drought. Drabo and Mbaye (2011) find that migration increases with the intensity levels of meteorological disasters (mainly storms), and with the extent of damages caused by hydrological disasters (floods, wet mass movements, drought and wildfire).

6.2.2.2 Income and Wealth: The ability of households to migrate in response to natural disasters depends on the levels of their income and wealth. Episodes of migration, even when short-term and proximate, incur a certain cost which many poor households may not be able to afford. For example, Findley (1994) finds that despite recurring and severe drought in Mali, the poor did not migrate in very large numbers as they lacked the resources to do so. On the other hand, Kugler and Yuksel (2008) find that Hurricane Mitch caused even poor households in the Honduras to migrate. Similarly Halliday (2006) finds that in the case of El Salvador, natural disasters and agricultural shocks led to increases in out-migration of poor agriculturalists to the US. The later effect alludes to the greater need for poor households to migrate when faced with hardship, somewhat as a last resort. In such cases the non-poor can afford not to migrate, even as they are better placed to finance an episode of migration. This suggests a non-linear relationship between household income and the propensity to migrate in the face of shocks. The possible non-linearity also speaks directly to two seemingly opposing strands of the literature on migration as a means of adaptation and coping; while some (Barnett and Jones, 2002; IOM, 2007) view migration as a positive adaptation strategy, others (Oliver-Smith, 2009) view it as a maladaptive practice which reflects the failure/limits of household coping.

6.2.2.3 Education Levels: The ability to migrate also depends on households' non-income endowments, particularly in the form of education. Previous studies have found that education increases the ability of individuals to migrate, and that natural disasters are likely to trigger brain-drain in developing countries through increasing the out-migration of high-skilled people (Drabo and Mbaye, 2011).

6.2.2.4 Access to Social Networks: McKenzie and Rapoport (2010) show that migration depends on access to finance through wealth only in communities with small migration networks, but is less important in communities with larger migration networks, thus emphasising the salience of social networks even when accounting for wealth differentials in determining migration. Munshi (2003) finds that social networks significantly improve the employment outcomes of Mexican migrants in the US, and more broadly on occupational mobility of communities in India (2011). In Pakistan, social networks have been shown to be particularly important for individuals/households to be able to migrate and access jobs (Gazdar, 2003; Haas, 2010).

6.2.3 Disaster Risk v/s Uncertainty and Migration

Fafchamps (2003), while distinguishing between high and low frequency risks, notes that other things being equal (including the intensity of the risk, upon realisation), high frequency risks are more dangerous than low frequency risks. This, however, is not immediately clear as households may often anticipate, and therefore be better prepared/able to minimise losses arising from more regularly occurring risk factors, compared to low frequency (and therefore lesser anticipated) events. Gallagher (2014) shows that insurance take-up spikes in the year following floods in the US, and gradually subsides thereafter. He explains this as a result of a Bayesian learning process under which some agents either do not observe the entire past history of floods (if they recently migrated to the area, or are too young to remember), or quite simply, they forget. Agarwal *et al.* (2008) also find that learning, in their case through add-on fees on credit card payments, is not monotonic, and that "learning displays a strong recency effect." These studies suggest that more frequent exposure to shocks reduces the likelihood of forgetting ways to survive and cope, and thus can enable households to remain better prepared to respond to recurring shocks. On the other hand, adaptive capacities that may have been developed as a result of exposure to a shock in the past may be forgotten or lost over time in the absence of shock recurrence.

The academic literature makes a useful technical distinction between risk and uncertainty (as far back as Knight, 1921). Dercon (2003) characterises risk as the 'known unknowns', i.e. threats that people can have some expectation, even past experience of, which allows them to employ strategies to mitigate the impact of such risks. Uncertainty on the other hand, includes those occurrences that people could never have possibly foreseen, and therefore constitute the 'unknown unknowns'. Uncertainty in this chapter therefore is not synonymous with risk – as it often is confused in colloquial use, measured by the variance of flooding exposure over time, for example. Instead it represents the extent to which the risk of flooding shocks are known to households – based on likely past exposure to floods, and proxy-measured by the extent to which the 2010 floods were anomalous or routine, at the community level. The Ellsberg Paradox is central in this discussion as it points to agents' preference for taking risk in gambles where the odds of succeeding are known, compared to those where the odds of success are unknown (Ellsberg, 1961). The Ellsberg paradox alludes to the operation of 'ambiguity aversion' (or uncertainty aversion), according to which, agents prefer known risks to unknown risks (Gilboa and Schmeidler, 1989; Schmeidler, 1989; Epstein, 1999, Etner *et al.*, 2012). Ambiguity aversion has been shown to underlie many decisions that people make. Alary *et al.* (2013) show that ambiguity aversion has the same effect on agents as pessimism does under subjective expected utility theory, and therefore increases the incentive to take up insurance. Mukerji (1998) argues that ambiguity aversion also explains incomplete contracts in inter-frim relations. Ghirardato and Katz (2000) develop a model to explain voters' selective abstention in multiple elections. The development economics literature, however, has not sufficiently engaged with how ambiguity aversion, in the case of unfamiliar shocks, can affect individual and household choices.

Returning to the specific case of natural disasters shocks and migration, households may not be able to deploy strategies to limit the onset and effects of an essentially completely unanticipated shock. While in reality most natural disaster shocks are somewhere along the spectrum ranging from completely identifiable (and recurring, or periodic) risk to states of perfect uncertainty, the empirical literature on the effects of and responses to natural disasters has mainly focused on disaster risk. This relatively higher academic emphasis on disaster risk, in terms of households' abilities to anticipate and mitigate against it, as well as public policy interventions that can help households in doing so, has eclipsed the potentially important role of disaster uncertainty in affecting household behaviour.

In the following sections I describe how I seek to measure flooding anomaly (which indicate the extent to which the flooding shock was uncertain), and subsequently show how more anomalous flooding in fact reduces post-flood migration in the context of the 2010 floods in Pakistan.

6.3 Background to the 2010 Floods in Pakistan

Pakistan experienced its most severe flooding in recorded history in 2010, which started during the monsoon season in July-August 2010. This was caused by exceptionally heavy rainfall, which inundated much of the Indus river basin, and also led to severe flash flooding in many areas not directly linked with major river systems. An estimated one-fifth of the total land area of Pakistan (796,095 square kilometres), spread across its four large provinces: Sindh, Balochistan, Punjab and Khyber-Pakhtunkhwa. The volume of rainfall in Pakistan as a whole was 87% above normal in the year 2010; this was much higher for the province of Sindh (where it was as high as 270%). The flooding began with exceptionally heavy rainfall in the Khyber-Pakhtunkhwa province and gradually moved south through Punjab, Sindh and Balochistan; along the Indus river valley. The official death toll due to the floods was about 2,000. However, according to Government of Pakistan estimates, about 20 million people were affected by the floods through displacement and damages to land, property and livestock.

While the level and intensity of flooding in 2010 were significantly higher than previously recorded in Pakistan's recent history, it is important to note that there was considerable variation in the nature of flooding across the country; on four distinct counts:

1. **Source of flooding:** the 2010 floods in Pakistan were caused due to both, torrential rain and flash flooding, mainly (but not only) in the northern areas of the country, as well as the flooding of river waters in the Indus and Swat river basins. Much of the riverine flooding was in fact caused by the backwash of heavy rainwater from the northern regions. At the community level, flooding may have been caused either by torrential rains, or due to the inundation of rivers and the breaking of banks and barrages, or in particular cases, by a combination of rain and riverine flooding.
2. **Intensity of Exposure:** While a large part of the country was affected by the 2010 floods, the extent to which areas communities exposed to flood waters differed considerably, depending on a combination of meteorological, geographical (location-related) and topographical factors that vary immensely across the territory of a country as large as Pakistan.
3. **Nature of Household-level Exposure:** The nature of flooding exposure also varied considerably across communities and areas in Pakistan. While some areas, particularly in the Northern and higher altitude regions, and areas affected by flash flooding, were, on average, subject to higher levels of floodwater inundation, the entry and drainage of such high levels of water was also rather fast. In contrast areas in the South, at lower altitudes and affected more by riverine flooding may have had lower levels of floodwater in general, but possibly for a longer duration of time. The extent of flood exposure, therefore, should not be measured only with a measure of either the depth or the duration of floodwaters at the household/community levels, but through some combination of these two dimensions, to make comparisons of flood exposure more meaningful.
4. **Extent of past exposure:** While the 2010 floods in Pakistan were, as a national phenomenon, unprecedented in its recent history, at the local level the degree of prior exposure to floods varied considerably. Notably, areas close to the Indus and other river basins are used to some degree of flooding on a recurrent basis (even though 2010 may have been much higher than the usual). In contrast, the 2010 floods also hit places that had never been flooded over long periods of time, particularly in areas that were hit by torrential rain. For example, some communities of Sindh that

were flooded by rains in 2010 were in fact situated in desert areas where the levels of rainfall have historically been very low.

6.4 Data and Identification Strategy

I use a simple probit model to estimate the impact of flooding severity and flooding anomaly on the propensity of household and individual migration in the aftermath of the floods. I use self-reported household survey data on the extent and duration of floodwater in the house to construct an index of household-level flood exposure. I use the index of flooding exposure as an independent variable to determine the causal effect of flooding exposure on migration outcomes, which I also show to be robust to the inclusion of pre-flood household and community controls, including pre-flood characteristics that determine flood exposure. As I measure flooding exposure at the community level, I attempt to capture the direct and indirect effects of flooding severity that is common to all households within the community.

Similarly, I develop a measure of flooding anomaly based on deviations (in 2010) from the 29-year average rainfall at the community-level, as well as the communities' distance to major rivers (as two dimensions of flood prone-ness or recurrence – described in detail in 6.4.3 below). As with the Index of Flooding Exposure, I show that the negative effect of the Flooding Anomaly index on household and individual migration is robust to the inclusion of a wide range of controls, specifically including pre-flood characteristics that determine the extent of flooding anomaly.

6.4.1 Data Sources

6.4.1.1 Household data: For my analysis I use the baseline cross-section of the CDCP Impact Evaluation dataset (OPM, 2013). This dataset is representative of all flood-affected areas of the four major provinces of Pakistan: Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan. The dataset comprises 7802 households across 498 primary sampling units, including 448 rural, and 50 urban communities. The survey for the baseline was conducted during December 2011 – February 2012, after the rollout of the first phase of the CDCP flood relief transfer.[78] The survey comprised detailed questionnaires for male and female respondents at the household level, and a detailed community-level module. Notably, the survey included questions of household and individual migration, flood exposure at the household level, the receipt of flood relief transfers as well as a wide range of individual, household and community –level characteristics.

6.4.1.2 Meteorological Data: In addition to self-reported data at the household level on flooding exposure collected in the household dataset described above, I use data from the National Aeronautical and Space Agency (NASA)'s Prediction of Worldwide Energy Resource (POWER) data resource, available online[79] to obtain daily precipitation records from 01 January 1981 to 31 December 2010. The NASA POWER data resource has been made available through the NASA Langley Research Center POWER Project and was funded through the NASA Earth Science Directorate Applied Science Program (methodology explained in NASA, 2015). These records are available at the 0.5 degree level (i.e. at grids of the 0.5 x 0.5 degree resolution) and are matched to the household survey data using GPS coordinates for the community (using the community-level simple mean of sample households' latitude and longitude recordings to arrive at a single observation for the community). Recent studies have used NASA POWER data on precipitation for Pakistan, including Mueller *et al.* (2014) and Kosec and Mo (2014).

6.4.1.3 Proximity to Rivers: In order to measure communities' proximity to rivers -which proxies for recurrence of flood exposure – I calculate the distance between the community and the nearest (major) river. GIS Data on the location and course of rivers was obtained from the Pakistan Rivers shape file made available online[80] by the UN Office for the Coordination of Humanitarian Affairs (UNOCHA 2012) – Pakistan Office.

[78] The cross section serves as a baseline for Phase II of the CDCP transfers; it, however, contains retrospective questions on the receipt of CDCP Phase I transfers that I use for my analysis.
[79] At http://power.larc.nasa.gov/cgi-bin/cgiwrap/solar/hirestimeser.cgi?emai
[80] At http://www.humanitarianresponse.info/en/operations/pakistan/datasets

Distances between the community and the nearest river included in the shape file were calculated using QGIS geo-processing software.

6.4.2 Measurement of Flooding Intensity and Anomaly

I exploit variation in the intensity of flooding and the degree of flooding anomaly in Pakistan to identify their distinct effects on household and individual migration. I first describe how I construct indices to measure flooding intensity and flooding anomaly at the community-level. In 6.4.3, I proceed to examine if these indices are significantly related to pre-flood community characteristics.

6.4.2.1 Index of Flooding Exposure:

As the entire household sample comprises flood-affected villages (the sampling universe being the list of all flood-affected villages in the four large provinces of Pakistan), I proxy variations in the intensity of flooding by developing an index of flood exposure at the household (and subsequently community) level, using the self-reported depth and duration of floodwaters in the home. Guiteras *et al.* (2015) have shown that self-reported data on flooding experience is problematic for accurately depicting flood exposure, compared to objective satellite data on flooding. This, they suggest, is because it suffers from recall bias, as well as cognitive bias such as reference dependence which means that households report whether or not they have experienced flood based on their long-term reference for flooding, which in turn is likely to result from adaptation. By this reasoning, households more periodically exposed to flooding should be less likely to self-report flooding incidence.

In the Guiteras *et al.* (2015) case, however, the measure of flooding is only based on the extensive margin, i.e. households' report of whether or not they were affected by (in their case) the 2004 floods in Bangladesh. Such an assessment is indeed likely to be influenced by the past experience of flooding and the resultant difference in reference levels for a household to judge whether or not it was flood-affected. In contrast, I argue that an index of flooding exposure based on objective measure of floodwaters' depth (in feet) and duration (in days) in the home, as in this chapter, is less affected by subjective judgment.

Further, the standard used by Guiteras *et al.* (ibid.) to assess the accuracy of self-reports is satellite data, which only (again) indicates whether or not a particular area is flooded, and not the extent of flooding – which is the focus of the present analysis.

The household survey dataset includes questions on the depth and duration of floodwaters in the house. Del Ninno *et al.* (2002) develop a household-level flood exposure index for the 1998 floods in Bangladesh using similar information on floodwater depth and duration. I use the formula developed by these authors as a starting point for my own analysis. First, the self-reported depth of floodwater (in feet) and its duration (in days) are assigned scores based on class intervals developed by the authors. The depth and duration scores assigned are shown in Table 1 below:

Table 1. Depth and Duration scores[81] for Flood Exposure

Depth of Floodwater in the House (feet)	Depth Score Assigned[82]	Duration of Floodwater in the House (days)	Duration Score Assigned[83]
0	0	0	0
1	1	0 – 7	1
2	2	8 – 14	2
3	3	15 – 30	3
4	4	31 – 60	4
5	5	> 60	5
≥ 6	6		

I develop a slightly modified version of a flood exposure index compared to that developed by del Ninno *et al.* (2001). Whilst del Ninno *et al.* use a simple additive index of the depth and duration scores, and also include a score for flooding in the households' agricultural plots, I restrict the analysis to flood exposure within the household (owing

[82] In the case of depth respondents were asked to round off responses to the closest integer value of depth in feet.
[83] This was assigned exactly as in del Ninno *et al.* (2001).

to data limitations and also to prevent any noise in the measure of flood exposure due only to the fact that many households do not possess any agricultural land). I then develop a household level Flooding Exposure Index, given by the following formula:

$$FEI_{hh} = \log_e [1 + (\text{DepthScore X DurationScore})]$$

… (1)

Even as the 2010 flooding in Pakistan at the aggregate level was an unforeseen, unprecedented and massive shock, the household-level exposure to flood waters, in terms of both depth and duration, may be affected, at least partly by household pre-flood well-being, wealth and shock-absorptive capacity. For example, well-off households may have better roofs/construction material, and drainage access which could reduce the depth and duration of floodwaters in the house, thus causing the Flood Exposure Index to be an underestimate of the objective flood exposure. Any resilient behaviour shown by such households may therefore be wrongly attributed to a lower flood exposure, whereas the reality is that pre-flood wealth/well-being/resilience capacity may be responsible for both, a lower Flood Exposure Index, as well as the (post-flood) household outcome demonstrating resilience.

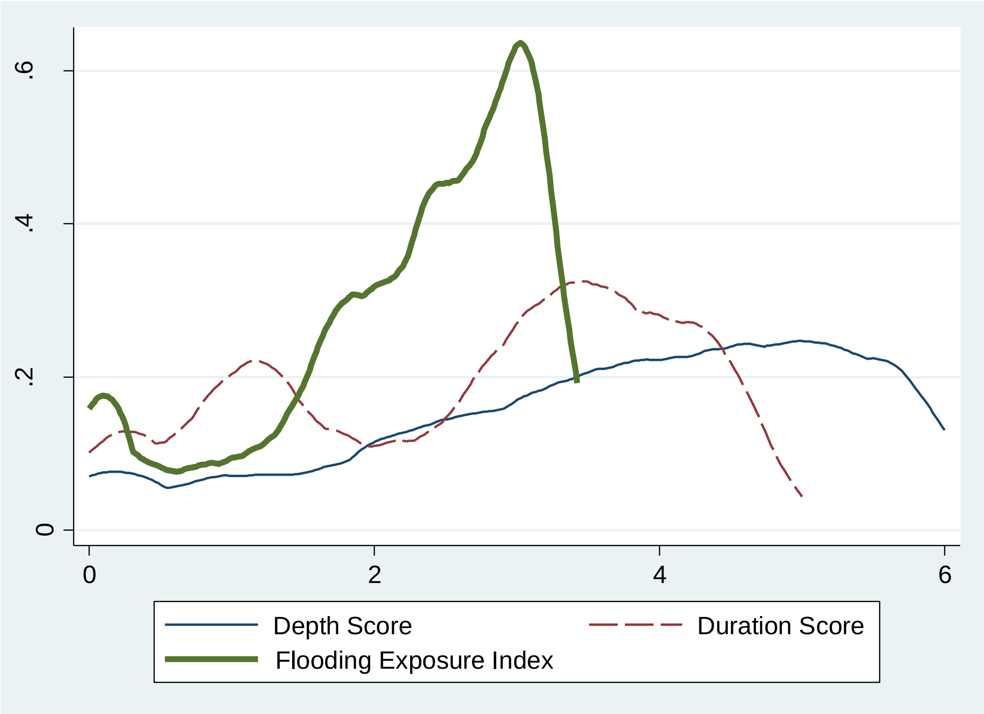
In order to circumvent/reduce this problem, I use the community-level average of the Flood Exposure Index, to reflect more accurately the common (average) extent of natural disaster exposure. The community-level Flood Exposure Index, FEI_c is given by the formula:

$$FEI_c = \frac{\sum_{i=0}^{n} FEI_{hh}}{n}$$

… (2)

Where n is the number of sample households in the community, c; and FEI_{hh} is the household-level Flood Exposure Index defined in (1) above.

Fig. 1. Kernel density estimate of community-level Floodwaters' Depth Score, Floodwaters' Duration Score and Flooding Exposure Index (FEI_c)



6.4.2.2 Flooding Anomaly: Measuring the degree of flooding anomaly or rarity requires estimating the frequency and regularity of past exposure. A higher deviation of flooding exposure from the long term trends of flooding represents greater degree of unanticipated shock, which Guiteras *et al.* (2015) refer to as "novelty value". For the households in the current sample, while there is data on flooding exposure in 2010 (as described in 6.4.1.1), there is no historical or long-term data on the household, or community-level incidence of flooding. In the absence of such data, I therefore attempt to proxy the deviation (in 2010) from the likely average exposure (and susceptibility) to flooding in the past.

The historical exposure to flooding is a function of both, rainfall levels, and exposure to riverine flooding. Guiteras *et al.* (2015) rightly note that rainfall shocks are an insufficient proxy for flooding, and this is particularly true for the 2010 floods in Pakistan that saw flooding arise due to torrential rain, the flooding of rivers, and the breaking of barrages. I therefore develop a proxy measure for the degree of flooding anomaly at the community level, based on the premise that for a community that experienced flooding in 2010, (i) the farther the community is to a river, and (ii) the higher the rainfall in 2010 relative to the historical average, the more anomalous were the floods likely to be (also invoked by Maystadt *et al.*, 2014). The proxy Index for Flooding Anomaly is based on observable data on two dimensions:

i. **Deviation from historic rainfall levels:** Using NASA satellite data I measure how much the rainfall in 2010, particularly the four Southwest Monsoon months (June – September) when the bulk of the flooding occurred, deviated from the long-term (over the 29 preceding years) mean for the same period. NASA rainfall data are available at the 0.5 degree resolution for each day over the period beginning 01 January 1981, and this grid-wise time series was mapped to each of the sample communities. This allows constructing a simple index of rainfall deviation in 2010. The measure of rainfall deviation is given by:

$$Rf_{DEVIATION} = \frac{Rf_{2010} - Rf_{81-09}}{\sigma(Rf_{81-09})} \quad \dots (3)$$

Rf_{2010} is the average daily rainfall during June – September, in 2010

Rf_{81-09} is the average daily rainfall during June – September, over 1981 – 2009, and

$\sigma(Rf_{81-09})$ is the standard deviation of daily rainfall during June – September, over 1981 – 2009

ii. **Distance from Rivers:** The underlying assumption with using the nearest distance from major rivers as one dimension of flood anomaly is that flooding is more recurrent in areas closer to rivers. This is a simple measure of distance between the community and the closest river calculated using QGIS.

For rainfall deviation and distance from rivers, I standardise measures and them add them up to arrive at a simple proxy Index for Flooding Anomaly.

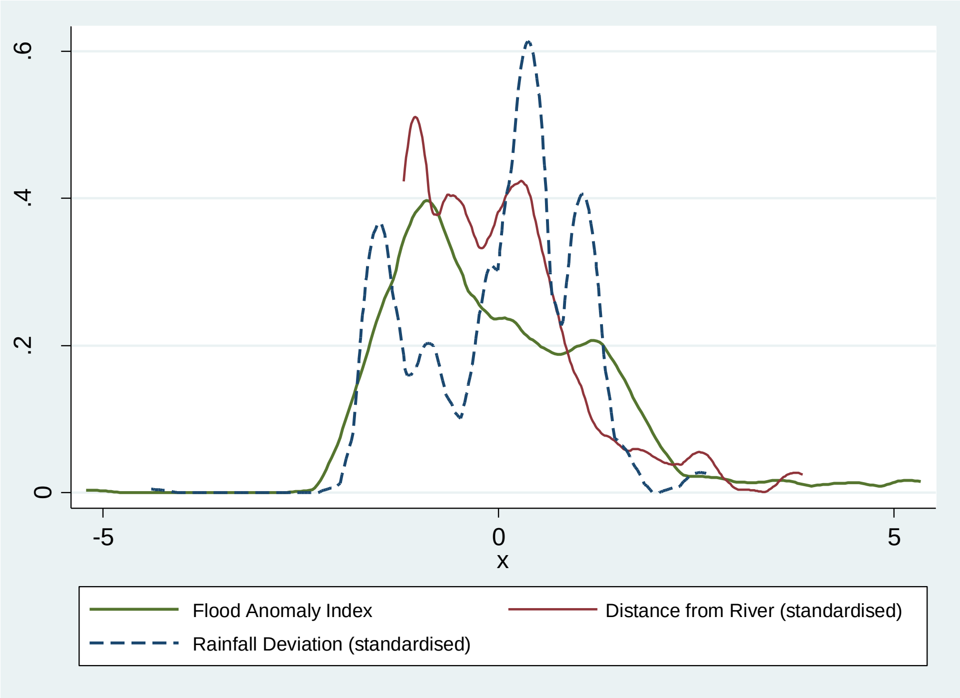
$$FAI = Z1(Rf_{DEVIATION}) + Z2(RiverDistance) \quad \dots (4)$$

Where FAI is the Flooding Anomaly Index, which is defined to be the sum of:

Z1, the standardised measure of the deviation of rainfall in the community in 2010 from the preceding 29-year average, and;

Z2, which is the standardised distance of the community from the nearest (major) river

Fig 2. Kernel densities of Standardised Rainfall Deviation (2010 v/s 1981-2009), Standardised Distance from Rivers and Flooding Anomaly Index



6.4.3 Identification: Pre-Flood Determinants of Flood Exposure and Flood Anomaly Indices (to subsequently include as controls)

Any estimation of the effect of community-level flooding severity and flooding anomaly on migration outcomes must consider the likely effect of several factors that determine flooding exposure and the extent of flooding anomaly in the first place. Factors such as education levels, access to social networks, proximity to administrative centres, wealth and infrastructure may simultaneously determine the extent to which households and communities experience flooding (or were able to limit its severity), as well as their post-flood ability to migrate. Similarly, the recurrence or rarity of floods before 2010 may itself affect communities' and households' endowments of education, wealth, social connectedness etc., as well as affect the ability to migrate in the aftermath of the 2010 flooding. Flooding Exposure, and the extent of Flooding Anomaly are themselves determined by (or correlated with) a combination of pre-flood characteristics. Not controlling for these would bias the econometric estimation of the causal effects of flooding exposure and flooding anomaly on migration outcomes, as any observed effects of these two variables on migration may in fact be caused by their determinants.

In order to identify the pure causal effect of flood exposure and the extent of flooding anomaly on migration, i.e. net of the effect of pre-flood characteristics that determine these two variables, I first identify the determinants of flooding exposure and flooding anomaly. I then include these determinants as controls in the regressions that estimate the effect of flooding anomaly and flood exposure on migration. I find that my results are robust to the inclusion of these pre-flood controls.

I regress the Flood Exposure and Flooding Anomaly indices (separately) on a number of pre-flood community characteristics including adult education levels, pre-flood household wealth indicators, topography features, access to basic services in the community including drainage and electricity, social connections outside the community, intra-community linguistic fractionalisation (as a proxy of cohesiveness), community institutions and infrastructure, and distance from administrative centres. The results from the OLS regressions are presented in tables 2 and 3 below, followed by a brief discussion on which pre-flood characteristics emerge as significant determinants of the two indices.

Table 2. Determinants of Community-level Flood Exposure: OLS Regression Results - Dependent Variable: Flood Exposure Index

	Coefficient	*t*-statistic
Urban	0.129	0.99
Share of Adult Females with Primary Education	0.833*	1.96
Share of Adult Males with Primary Education	0.403	1.23
Share Adult Females with Secondary+ Education	0.692	1.48
Share of Adult Males with Secondary+ Education	-0.185	-0.78
Share HHs with Electricity	-0.220*	-1.70
Share HHs with Drainage	-0.185	-0.97
Share of Female-headed HHs	-0.476	-1.28

Average No. of Rooms per HH	-0.367***	-4.44
Share of HHs with Non-agricultural enterprise	0.200	0.93
Share of Landless HHs	0.384**	2.52
Share of Rentier Landlord HHs	0.273	0.59
Share of Adult Males in the community	-0.536	-0.72
Average no. of social contacts outside community per HH	-0.062***	-3.28
Distance to province capital	0.130***	2.91
Distance to district capital	0.040	0.35
Index of Presence of State Institutions	-0.046	-1.32
Index of Community Infrastructure	0.002	0.07
Index of Linguistic Fractionalisation	0.132	0.88
Topography: Inland Plain	0.122	0.36
Topography: Coastal Plain	0.271	0.72
Topography: Plateau	-0.444	-0.98
Topography: Hills	-1.109***	-2.82
Topography: Valley	-0.329	-0.77
Topography: Mountain	-1.407***	-3.70
Topography: Other	-0.568	-1.18
Punjab	0.022	0.12
Sindh	0.568***	3.60
Balochistan	0.724***	4.75
Constant	2.385***	4.16
N	497	
R^2	0.551	

t statistics in second column
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2 above shows that flooding exposure is higher among communities that are further away from provincial capitals, have higher share of landless households and adult women with primary education. Higher average numbers of social connections outside the community, and rooms in the house (a marker of wealth), and greater community-level access to electricity are associated with lower flood exposure. Among topographic factors, hilly and mountainous areas have lower flood exposure. Other factors including adult male education, the prevalence of female-headed households, community rural/urban status, linguistic fractionalisation, community-level infrastructure and presence of state institutions do not appear to determine community-level flood exposure.

Table 3. Determinants of Community-level Flooding Anomaly: OLS Regression Results - Dependent Variable: Flooding Anomaly Index

	Coefficient	*t*-statistic
Urban	0.064	0.32
Share of Adult Females with Primary Education	0.543	0.82
Share of Adult Males with Primary Education	-0.316	-0.62
Share Adult Females with Secondary+ Education	-0.057	-0.08
Share of Adult Males with Secondary+ Education	-0.330	-0.90
Share HHs with Electricity	0.461**	2.30
Share HHs with Drainage	-0.648**	-2.17
Share of Female-headed HHs	-0.919	-1.59
Average No. of Rooms per HH	0.433***	3.37
Share of HHs with Non-agricultural enterprise	-0.196	-0.59
Share of Landless HHs	-0.096	-0.41
Share of Rentier Landlord HHs	-0.648	-0.90
Share of Adult Males in the community	-0.306	-0.26
Average no. of social contacts outside community per HH	0.019	0.63
Distance to province capital	0.640***	9.20
Distance to district capital	-0.230	-1.31
Index of Presence of State Institutions	-0.076	-1.41
Index of Community Infrastructure	-0.046	-1.33
Index of Linguistic Fractionalisation	0.338	1.45
Topography: Inland Plain	-0.021	-0.04
Topography: Coastal Plain	-0.755	-1.29
Topography: Plateau	-0.237	-0.34
Topography: Hills	0.304	0.50
Topography: Valley	-1.060	-1.60
Topography: Mountain	0.602	1.02
Topography: Other	1.380*	1.85
Punjab	-1.833***	-6.51
Sindh	-2.463***	-10.04
Balochistan	-1.510***	-6.37
Constant	0.013	0.01
N	497	
R^2	0.495	

t statistics in second column

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Most pre-flood community characteristics do not appear to have a significant association with the index of flooding anomaly. Communities witnessing more anomalous flooding are more likely to be further away from provincial capitals, have higher rates of electricity access and average number of rooms in the house, and also lower average access to drainage. However, they are no more likely to differ in terms of topography, community infrastructure and state presence, adult education levels, land ownership patterns, enterprise ownership, social connections outside the community, intra-community linguistic fractionalisation and the prevalence of female-headed households.

As we see in tables 2 and 3 above, a few (but not most) pre-flood characteristics determine the flood exposure and flooding anomaly indices. I include the full list pre-flood variables (in tables 2 and 3) as controls in the estimation of migration outcomes in section 5. This would ensure that the observed effect of the Flood Exposure and Flooding Anomaly indices on migration is not conflated by any effects of the wide range of pre-flood community characteristics, some of which I find to be significant determinants of the indices themselves.

A few studies have explored the effects of cash transfers on migration and how these may vary for different groups and under alternate conditions. Angelucci (2013) finds that poor households with access to Mexico's *Oportunidades* cash transfer programme are more likely to migrate to the US compared to a control group, indicating that the poor are indeed budget-constrained in migration decisions. This effect operates likely through the greater availability of loans from local (informal) lenders to households in receipt of the recurring Oportunidades transfers. Further Angelucci (2004) shows that the conditionality of transfers affects recipient households' migration decisions as unconditional transfer receipts cause increases in migration to the U.S., whereas conditionality linked to school subsidies deters short-term migration. Mesnard (2009) finds that the *Familias en Accion* cash transfer programme in Colombia was able to prevent migration and encouraged people to stay in their villages. However, as the level of civil conflict intensified, access to the programme enabled households to migrate outside, suggesting that cash transfer programmes can affect the propensity to migrate both positively, and negatively.

While there is mixed evidence on the effects of cash transfers on migration, it is important to consider that any effects of flooding anomaly on migration may in fact be due to differential access to flood relief across areas with more /less anomalous flooding. This may be because areas with recurrent flooding may have better capacity to roll out flood relief programmes, resulting in better access to cash transfers. This may, in turn, cause higher migration viz. areas with lesser institutional history of flood relief and therefore lower coverage of relief. This is not likely to be a very strong factor in Pakistan because despite some areas witnessing floods more regularly, as 2010 was the first time such a cash based flood relief transfer was implemented in the country. The threat of institutional memory and familiarity with flood relief conflating the effect of flooding anomaly should therefore be low. However, to ensure that the causal effects of flooding exposure and the degree of flooding anomaly on household and individual migration are not confounded by any selective access to public transfers, I control for access to the two large state-run cash transfer programmes: The Citizens Damage Compensation programme (CDCP – Phase I transfers), and the Benazir Income Support Programme (BISP). I include dummy variables that denote receipt of cash transfers through these two programmes at the household level.

To summarise, the causal identification for this chapter is based on the proposition that after controlling for a wide range of observable pre-flood economic, administrative, social and geographical factors – some of which have a direct effect on the extent of flooding severity and flooding anomaly – the Flooding Exposure Index and the Flooding Anomaly Index can be treated as independent variables to determine causal effects on the propensity to migrate. While I control for a wide range of observable characteristics that can be potential confounders, I lack a natural or quasi-experiment that can overcome any effects of selection on unobservables. I address this limitation by calculating the extent of selection on unobservables, relative to the selection on observables that would be required to nullify the results that I present in section 5 below (following Altonji *et al.*, 2004, Miguel and Bellows, 2009, and Kosec, 2014). I am reassured that only a very high ratio of selection on unobservables to the selection on the extensive set of observables that I control for can nullify my results.

6.5 Results

6.5.1. Descriptive Statistics

I first examine the prevalence of migration in the year following the 2010 floods. The survey questionnaire, administered about one year after the floods asked questions on whether or not any members had migrated since the floods, and whether they had returned to the household or were still away. Column 1 Table 2 below shows the (survey-weighted) share of households that reported at least one member having migrated since the floods, whereas the second and third columns show the share of households with any migration that reported at least one member having returned (i.e. returnee migrants), and the share of households among those with any migration where at least one member was still away from the household (i.e. still a migrant), respectively. I present estimates of the household-level prevalence of migration at the national and provincial levels.

Table 4. National and Provincial estimates of household migration – Any, Return and Continuing

	HHs with any member having migrated since 2010 floods	HHs with any return migrant^	HHs with any migrant still away^
National	57.96%	97.26%	8.59%
Punjab	61.25%	96.37%	11.95%
Sindh	84.93%	100%	2.59%
Khyber Pakhtunkhwa	25.59%	91.72%	11.92%
Balochistan	44.68%	99.65%	0.70%

^ Among households with any migration at all

Table 4 above shows that the majority of households residing in flood affected areas (the sample universe) undertook some migration following the floods. The provincial estimates range from a low of just over 25% in Khyber Pakhtunkhwa to as high as 85% in Sindh. Secondly, we see that for most households, migrants returned home at some point within the year. The share of households with members having migrated since the floods and who continue to live away from the household after a year is very low in Balochistan and Sindh (at 0.7% and 2.6%, respectively), and over 11% for Punjab and Khyber Pakhtunkhwa. This suggests that migration in the year following the 2010 floods was essentially temporary and short term, with only a very small share of households with members who continue to reside in the migration destination a year on. This is also visible in the estimates of individual-level migration presented in table 5 below.

Table 5. National and Provincial estimates of Individual* migration – Any, Return and Continuing

	Individuals aged 13 and above having migrated since 2010 floods	Individual migrants having returned since migrating^	Individual Migrant Still Away^
National	52.92%	97.97%	2.03%
Punjab	55.51%	97.19%	2.81%
Sindh	80.78%	99.41%	0.59%
Khyber Pakhtunkhwa	21.04%	95.91%	4.09%
Balochistan	43.43%	99.85%	0.15%

*All individuals aged 13 and above
^ Among households with any migration at all

The estimates of household and individual level migration do not appear to be drastically different at the national and provincial levels. This may be because in the short run after the floods, families may have been likely to migrate together. Table 6 below presents the population estimates of the share of household members aged 13 and above who migrated at all following the 2010 floods.

Table 6. Share of Household Members aged 13 and above that migrated at all

Share of Household Members aged 13 and above that migrated at all	% of Households
0	42.04%
> 0 and ≤ 0.25	1.33%
> 0.25 and ≤ 0.5	2.45%
> 0.5 and ≤ 0.75	2.17%
> 0.75 and ≤ 1	1.84%
1	50.17%

Table 6 above shows that for the vast majority of households, migration involved all or no members, with only a very small share of households (7.79%) where migration was undertaken but at least one but not by all members aged 13 and above. Table 7 below presents the national and provincial estimates of the share of households where all members (aged 13 and above) migrated, among households that reported any migration at all.

Table 7. National and Provincial estimates of Households with Members* Migrating En-masse^

	Households where all members Migrated
National	86.56%
Punjab	84.22%
Sindh	93.15%
Khyber Pakhtunkhwa	80.42%
Balochistan	88.00%

*All individuals aged 13 and above

^ Among households with any migration at all

Tables 6 and 7 above indicates that for the vast majority of households with any migrants at all, migration involved all family members (over 86% nationally). The strategic breakup or splitting of household members across the native community and migration destinations therefore does not appear to be a dominant strategy. Migrating households may of course have chosen different durations of stay (and consequently times of return) for different members. The survey questionnaire, however, does not contain details of the duration of migration or the dates of departure/return of individual migrants to allow a deeper examination of household strategies with regard to the timing and duration of migration and return and how this may vary across individual members.

As stated in the introduction, in this chapter migration is defined as any movement(s) by (an) individual member/s of a household to a destination outside their community for a period of one month or longer (including those who may have returned after at least one month away) between the onset of the 2010 floods and the time of the survey. As tables 4 – 7 show, the bulk of the migration observed in the dataset using the above definition is of a short-term duration (as any movement over one month is defined as migration), and typically involves the movement of the entire household. The levels and type of migration observed are very closely related to the definition of migration employed – which is distinct from that used in the wider literature on migration. The relatively shorter duration of time spent away from the community for an individual/ household to be identified as a migrant in the dataset (one month, compared to six months/ one year in other studies) compels the present analysis to focus more on short-term movements, presumably including those meant only to wait out floods (as most migrants returned home). The wider literature on migration however, focuses more on longer duration movements, motivated by reasons such as employment, education, marriage, and distress-induced relocation that typically involve some but not all household members, and is not characterised by such early return to origin communities. As a result of the definition of migration employed in the survey questionnaire, and due to the absence of data on the duration of migration, the focus of this chapter is overwhelmingly (though not exclusively – as a few members do indeed migrate for longer durations) on a distinct, possibly less common, and definitely under-studied form of migration: short-term movements, typically of entire families.

Given that migration in the year following the 2010 floods was largely short-term and that conditional on having migrated, a very high majority of migrants returned home within the year, in the following sections of this chapter I focus only on the propensity of households/individuals to migrate at all. I do not examine the effects of flooding exposure and flooding anomaly on the decision to return home or to continue to reside in the migration destination, conditional on migrating at all. Further, since the largest share of households that reported any migration at all comprises households where all members (aged 13 and above) migrated, I do not examine differences in the nature of household migration decisions i.e. en-masse v/s strategic split. Instead I measure the household propensity to migrate simply as whether or not any member of the household migrated in the year following the 2010 floods.

6.5.2 The effects of Flooding Intensity and Flooding Anomaly on Household and Individual Propensity to Migrate

I now examine the effects of flooding intensity and the degree of flooding anomaly on the propensity of household and individual migration. This is represented by the following two estimation equations:

$$Y_{hc} = \alpha + \beta_1(FEI)_c + \beta_2(FAI)_c + \beta_3 X_{hc} + \beta_4 P_k + \varepsilon_{hc} \qquad \dots (5)$$

Where

Y_{hc} is the likelihood of any member in household h in community c undertaking any migration since the 2010 floods

FEI_c is the Index of Flood Exposure at the community level, as described in 6.4. 2 (Eq. 2)

FAI_c is the Index of Flooding Anomaly at the community level, as described in 6.4. 2 (Eq. 4)

X is the matrix of household /community-level control variables.

P represents the matrix of k Province dummies

Similarly, Equation 6 below represents the estimation of individual migration decisions:

$$Y_{ihc} = \alpha + \beta_1(FEI)_c + \beta_2(FAI)_c + \beta_3 X_{ihc} + \beta_4 P_k + \varepsilon_{ihc} \qquad \dots (6)$$

Where

Y_{ihc} is the likelihood of individual i, in household h, in community c undertaking any migration since the 2010 floods

FEI_c is the Index of Flood Exposure at the community level, as described in 6.4. 2 (Eq. 2)

FAI_c is the Index of Flooding Anomaly at the community level, as described in 6.4. 2 (Eq. 4)

X is the matrix of individual/ household /community-level control variables.

P represents the matrix of k Province dummies.

Tables 8 and 9 below show the probit estimates of the effect of flooding exposure, and the extent of flooding anomaly on the likelihood of household and individual-level migration, respectively. Following the discussion in section 6.4.3, I focus on the results in column 4 as the main causal estimate of the effect of the two indices on the propensity and households and individuals to migrate, as the inclusion of controls is essential to control for potential confounders.

Table 8. Effects of Flooding Exposure and the degree of Flooding Anomaly on Any Household Migration: Probit Estimates (Any Household Member migrated = 1)

	(1)	(2)	(3)	(4)
Flooding Exposure Index	0.235***	0.212***	0.202***	0.196***
	(26.85)	(17.11)	(13.92)	(13.60)
Flooding Anomaly Index	-0.03015***	-0.02672***	-0.03135***	-0.03019***
	(-3.60)	(-3.02)	(-3.40)	(-3.28)
Province dummies	-	Yes	Yes	Yes
Community Controls	-	-	Yes	Yes
Household Controls	-	-	-	Yes
N	7802	7802	7786	7767
pseudo R^2	0.2071	0.2407	0.2978	0.3079

Marginal effects; *t* statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Standard Errors clustered at the PSU (community) level

Community Controls: Urban/Rural, topography, occupational characteristics, distance from administrative headquarters, social connectedness outside the community, intra-community linguistic fractionalization, community-level presence of infrastructure and state institutions, community-level adult education characteristics, community access to electricity, drainage, sex ratio

Household controls: Household size, Age of head, members' education levels, Farmland ownership, Number of rooms in the house, pre-flood livestock value, number of males, number of members over 14, household main occupation and enterprise ownership, female-headed (dummy), flood-induced displacement status, receipt of CDCP – I and BISP transfers, measure of social connections outside community

Table 9. Effects of Flooding Exposure and the degree of Flooding Anomaly on Any Individual^ Migration: Probit Estimates (Individual Member migrated = 1)

	(1)	(2)	(3)	(4)
Flooding Exposure Index	0.246***	0.223***	0.203***	0.193***
	(59.92)	(36.98)	(25.62)	(24.08)
Flooding Anomaly Index	-0.035***	-0.031***	-0.041***	-0.037***
	(-8.77)	(-6.34)	(-7.33)	(-6.59)
Province dummies	-	Yes	Yes	Yes
Community Controls	-	-	Yes	Yes
HH + Individual controls	-	-	-	Yes
N	30697	30697	30623	30554
pseudo R^2	0.2317	0.2628	0.3215	0.3311

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
^ Estimated for all individuals aged 13 and above
Standard Errors clustered at the household level[84]
Controls: In addition to the community and household-level controls listed in table 8, I control for individual characteristics – Age, Gender and Educational Attainment (categories)

Tables 8 and 9 above clearly show that, across specifications, flooding exposure has a strongly positive and highly significant effect on the likelihood of household and individual migration, in line with findings from the wider literature discussed previously. A unit increase in the flooding exposure index increases the likelihood of household migration (i.e. by at least one member), as well as an individual's migration by about 19%. Further, the Flooding Anomaly Index has a highly significant, negative effect on the likelihood of household and individual-level migration. A unit increase in the Flooding Anomaly Index reduces the likelihood of household migration by 3% and an individual's migration by 3.7%. The migration response to floods therefore depends significantly on the extent to which the community has been susceptible to flooding in the past, and therefore, arguably to the extent of people's familiarity with flooding shocks. Lower likely familiarity with floods reduces migration after their onset. As stated in 6.5.1, it is important to recall that the effects described above pertain to only a sub-set of migration that is observed globally: short-term movements (in most cases of complete households) in response to floods, and are therefore not generalizable beyond this subset.

In the results above, and for the remainder of this chapter I show causal effects of the (composite) Index of Flooding Anomaly on the Migration outcomes of interest. Recall that the Flooding Anomaly Index is a simple sum of the standardised measure of rainfall deviation, and the standardised nearest distance to a river, as described in section 6.4.2.2. I present results for the probit regression that includes these two constituent indices of flooding anomaly separately for the above and for subsequent tables, in Annexe 6.1. I find that in almost all cases the direction, level of significance, and even the magnitude

[84] Although the Flood Exposure and Flooding Anomaly indices are measured at the community level, for individual migration I cluster standard errors at the household level due to the higher intra-cluster correlation of individual migration within households (0.878), than within PSUs (0.547). I checked that the results remain significant even if I cluster at the PSU level.

of the effect of these two dimensions of flooding anomaly on migration outcomes is roughly the same (with the magnitude of coefficients on the standardised distance to rivers slightly higher), suggesting that the effects of flooding anomaly are driven by both, deviations in rainfall, and distance from rivers.[85]

6.5.3 Selection on Unobservables

In the results in tables 8 and 9 above, we see that the effect of the degree of flooding anomaly on the household and individual propensity remains largely unchanged even after controlling for a wide range of observable characteristics. Following Altonji *et al.* (2005), Miguel and Bellows (2009), and Kosec (2014), I calculate the ratio of selection on unobservables to the selection on observables to estimate the extent of any omitted variable bias arising due to selection on unobservables. Essentially, I estimate the magnitude of omitted variable bias that needs to be present to explain away the entire effect of the Flooding Anomaly Index, by examining the extent to which, controlling for flooding exposure, the OLS coefficient of the Flooding Anomaly Index changes after adding controls. This ratio is denoted by $\frac{\hat{\delta}_{OLS_C}}{\hat{\delta}_{OLS_{NC}} - \hat{\delta}_{OLS_C}}$ where C signifies Controls, and NC, No Controls.

Using the values of OLS coefficients in columns 1 and 4 of Tables 8 and 9 to calculate the ratio described above, I find that the selection on unobservables needs to be at least 755 times and 18.5 times the selection on the wide range of observables to completely offset the effect of the degree of flooding anomaly on household and individual, respectively. This is significant because it suggests that although lacking an experimental set-up that can eliminate the problem of selection on unobservables, only an exceedingly high level of selection on unobservables – relative to the selection on the wide range of observables controlled for – can wipe out the causal effects of flooding anomaly on migration observed in tables 8 and 9. That I control for a very wide range of factors including household and individual characteristics (demographics, education levels, pre-flood wealth, access to services, occupational categories) province-specific characteristics,

---

[85] See Annexe 6.1 for results using sub-indices as regressors, instead of the composite Flooding Anomaly Index

community characteristics (topography, occupational characteristics, distance from administrative headquarters, social connectedness outside the community, intra-community linguistic fractionalization, community-level presence of infrastructure and state institutions) and individual age, education and gender for the individuals' specification only makes it all more unlikely for selection on unobservables to explain away the results.

6.5.4 The Effects of Flooding Anomaly on Household and Individual Migration across Groups

6.5.4.1 Household Migration

Tables 8 and 9 above have shown that higher flooding anomaly reduces the household and individual-level propensity to migrate. I now examine this aggregate effect across sub-groups of the population, specifically across rural/urban, land ownership and demographic categories, as shown in tables 10, 11 and 12, respectively.

Table 10. Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Rural v/s Urban

	Total	Rural	Urban
Flooding Exposure Index	0.196***	0.194***	0.255***
	(13.60)	(12.92)	(7.90)
Flooding Anomaly Index	-0.030***	-0.024***	0.018
	(-3.28)	(-2.58)	(0.77)
Province dummies	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes
N	7767	7049	684

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11. Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Land Ownership Status

	Total	Landless Households	Own-land cultivating Households	Rentier Landlord Households
Flooding Exposure Index	0.196***	0.181***	0.223***	0.242***
	(13.60)	(12.12)	(10.99)	(6.46)
Flooding Anomaly Index	-0.030***	-0.029***	-0.028**	-0.005
	(-3.28)	(-2.96)	(-2.07)	(-0.20)
Province dummies	Yes	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes	Yes
N	7767	5208	2198	357

Marginal effects; t statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12. Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Demographic Characteristics

	Total	Female Headed Households	Age of Household Head		
			Below 40	40 – 59	60 and above
Flooding Exposure Index	0.196***	0.212***	0.201***	0.186***	0.216***
	(13.60)	(9.39)	(11.21)	(11.12)	(11.02)
Flooding Anomaly Index	-0.030***	0.031	-0.039***	-0.027**	-0.014
	(-3.28)	(1.58)	(-3.27)	(-2.57)	(-1.07)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes	Yes	Yes
N	7767	720	3147	3220	1400

Marginal effects; t statistics in parentheses
Standard errors are clustered at the community level | * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Tables 10 – 12 above suggest that while all sub groups of the population are more likely to migrate in response to greater flooding exposure, the negative effect of flooding anomaly on the household' propensity to migrate does not operate for all types of households. Specifically, urban households, landlord households (who rent out their lands for others to work on), female-headed households and households where the head is aged 60 and above are not affected by more anomalous flooding in terms of their propensity to migrate. This may possibly be because even in areas that have more recurrent flooding, these groups of households may be less mobile or prepared/inclined to migrate, and are therefore no different from such households in areas of anomalous flooding in terms of the preparedness and disposition to migrate. On the other hand, more mobile groups – such as landless and own land-cultivating households, male-headed households and younger households may be more likely to better anticipate and prepare to migrate in the eventuality of a flood in areas of recurrent flooding, but not in areas where flooding is a one-off. In other words, the effect of flooding anomaly on dampening migration is possibly driven by the relatively higher preparedness of the more mobile households to migrate, in areas witnessing more anomalous flooding. This is a suggestive interpretation that cannot be scientifically tested at present, given the paucity of data on pre-flood anticipation, inclination and material and non-material preparation for migration across groups. Future research should examine *why* some of these groups' household migration decisions are more responsive to flooding anomaly than others'.

6.5.4.2 Individual Migration

I now examine any differences in the effect of flooding anomaly on individuals' propensity to migrate, across gender, educational attainment and age characteristics.

Table 13. Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Gender

	Total	Male	Female
Flooding Exposure Index	0.193***	0.186***	0.201***
	(24.08)	(22.08)	(23.49)
Flooding Anomaly Index	-0.037***	-0.037***	-0.037***
	(-6.59)	(-6.48)	(-6.08)
Province dummies	Yes	Yes	Yes
Controls – as listed in	Yes	Yes	Yes

table 9			
N	30554	15227	15327

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14. Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Age Group

	Total	Age Group			
		13 - 25	26 - 40	41 - 55	56 and above
Flooding Exposure Index	0.193***	0.188***	0.201***	0.176***	0.224***
	(24.08)	(19.39)	(19.74)	(15.56)	(15.36)
Flooding Anomaly Index	-0.037***	-0.039***	-0.034***	-0.039***	-0.028***
	(-6.59)	(-5.62)	(-4.88)	(-5.10)	(-2.94)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes	Yes	Yes
N	30554	13016	7951	5749	3838

Marginal effects; t statistics in parentheses
Standard errors are clustered at the Household level
* p < 0.10, ** p < 0.05, *** p < 0.01

Table 15. Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Education Level

	Total	Education Level			
		Illiterate	Primary	Secondary	Higher
Flooding Exposure Index	0.193***	0.195***	0.192***	0.193***	0.159***
	(24.08)	(21.73)	(13.23)	(16.05)	(10.16)
Flooding Anomaly Index	-0.037***	-0.043***	-0.019**	-0.029***	-0.037***
	(-6.59)	(-6.80)	(-2.10)	(-3.41)	(-3.26)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes	Yes	Yes

N	30554	19988	4210	4865	1490

Marginal effects; t statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Tables 10 – 12 above clearly show that the effects of both, flooding exposure and flooding anomaly do not vary much across individuals' gender, demographic and educational attainment characteristics. This shows that the effects of flooding anomaly on migration decisions depend on household level characteristics, particularly land ownership, sex and age of the head of household, and rural residence, and not on individual attributes. This is also largely because the type of migration analysed in this chapter is of a very specific nature (as described in 6.5.1, to be of very short-term duration and mainly comprising the movement of entire households) where household, rather than individual characteristics have greater explanatory power, which is unlike the correlates of other kinds of migration studies in the wider literature (such as in Rosenzweig and Stark, 1989).

6.5.5 Choice of Migration Destination

I model the choice of migration destination as shown by equation 7 below:

$$Z_{ihc} = \alpha + \beta_1(FEI)_c + \beta_2(FAI)_c + \beta_3 X_{ihc} + \beta_4 P_k + \varepsilon_{ihc} \qquad \ldots (7)$$

Where

Z_{ihc} is the choice of migration destination (urban v.s rural estimated as a dummy for urban destination) of individual migrant i, in household h, in community c (And later, the distance between the migration destination and the origin community; represented as an ordinal category increasing from closer to farther)

FEI_c is the Index of Flood Exposure at the community level, as described in 6.4. 2 (Eq. 2)

FAI_c is the Index of Flooding Anomaly at the community level, as described in 6.4. 2 (Eq. 4)

X is the matrix of individual/ household /community-level control variables.

P represents the matrix of k Province dummies.

I find that the degree of flooding anomaly has no effect on the choice of urban vis-à-vis rural destination, whereas flooding exposure decreases the likelihood of migrating to an urban area. This is evident in table 16 below which shows the marginal effects of the flood exposure and flooding anomaly indices from the probit estimation of the likelihood of migrating to an urban destination, relative to a rural destination, for the individuals that migrated at all, in the aftermath of the 2010 floods. Column 2 of Table 16 shows the marginal effects of the two indices on alternate migration destinations in terms of distance from the origin community, based on ordinal probit estimates of successive categories of migration destinations. I compare the effect of the Flood Exposure and the Flooding Anomaly indices on the distance to the migration destination across four successive distance categories: within the district, within the province but outside the district, within Pakistan but outside the province, and abroad, for all individuals who migrated at all. I find that a greater degree of flooding anomaly increases the likelihood of more long-distance migration.

Table 16. Marginal Effect of Flooding Indices on Choice of Destination: Probit Estimate –individual migrants

	Urban Migration Destination Probit Estimate	Distance to Migration Destination Ordinal Probit Estimate
Flooding Exposure Index	-0.038**	0.073***
	(-2.42)	(5.44)
Flooding Anomaly Index	-0.011	0.045***
	(-0.97)	(4.72)
Province dummies	Yes	Yes
Controls – as listed in table 9	Yes	Yes
N	16490	16490

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

6.5.6 Possible Mechanisms linking Flooding Anomaly and post-flood Migration

While a detailed analysis of the precise mechanisms that link flooding anomaly with post-flood migration is beyond the scope of this chapter (and the data resources available currently), I attempt to present some initial descriptive analysis that can provide some suggestive evidence on how areas with more and less anomalistic flooding compared in terms of the resources and mediating factors that enable migration. As discussed in section 6.2, migration, including disaster-induced migration is facilitated by several factors such as access to social networks, household education, and resources (from savings, remittances, or on credit) to finance an episode of migration. The econometric results presented earlier control for household education levels and for the number of social contacts households have outside the village (which I assume did not change very much in the year following the floods, i.e. the post-flood observations of these variables are assumed to be strongly correlated with their pre-flood levels). Data on savings, debt and access to remittances, which also is only available in the post flood period, i.e. at the time of the survey, is possibly very different from pre-flood levels. This is because households are very likely to have used these financial transactions – borrowing, drawing down saving, and receiving remittances to cope with flooding shocks. Therefore, I am unable to include these variables in any econometric estimation as the post-flood levels of these variables is a likely outcome of flooding exposure itself.

I therefore only examine descriptive statistics of these variables, averaged at the community level, to examine if the average community-level rates of indebtedness and access to remittances, and average amounts of money saved, owed and received as remittances varies considerably across terciles of communities by the flooding anomaly index. This could potentially provide preliminary clues for why communities witnessing more anomalous floods were less prepared, and therefore less likely to migrate after the floods. Alternatively any differences could indicate how these groups (of communities, by extent of flooding anomaly) differed in terms of their coping behaviour given that they were differently able/prepared to migrate. This is a subject matter for future research to engage in greater detail. In table 17 below, I present the community-level mean post-flood values of some of these enablers/inhibitors of migration across terciles of the flooding anomaly index.

Table 17. Post-flood levels of Community-level Mean Savings, Remittances and Debt across Flooding Anomaly Index Terciles

	Lower Tercile	Middle Tercile	Higher Tercile
Debt			
Any Outstanding Debt	0.77	0.83	0.84
	[0.75,0.79]	[0.81,0.85]	[0.82,0.86]
Outstanding debt to bank/formal financial institution	0.03	0.04	0.06
	[0.02,0.04]	[0.03,0.06]	[0.05,0.08]
Outstanding debt to employer	0.05	0.05	0.03
	[0.03,0.06]	[0.03,0.07]	[0.02,0.04]
Outstanding debt to micro-lender	0.02	0.02	0.02
	[0.01,0.02]	[0.02,0.03]	[0.01,0.02]
Outstanding debt to money-lender	0.07	0.07	0.05
	[0.06,0.09]	[0.05,0.08]	[0.04,0.07]
Outstanding debt to family/friend	0.43	0.45	0.5
	[0.40,0.47]	[0.41,0.49]	[0.47,0.54]
Outstanding debt to shop (goods on credit)	0.45	0.45	0.43
	[0.42,0.48]	[0.42,0.49]	[0.41,0.46]
Outstanding debt to other lender	0.04	0.05	0.02
	[0.03,0.05]	[0.03,0.06]	[0.01,0.03]
Total Debt (PKR)	42,820	52,114	55,045
	[38287, 47353]	[47881, 56346]	[50962, 59127]
Savings			
Formal Savings (PKR)	856	742	952
	[43,1286]	[295,1189]	[421,1483]
Informal Savings (PKR)	12,288	16,495	15,818
	[9854,14722]	[13413,19578]	[13153,18483]
Combined Savings (PKR)	13,041	16,736	16,444

	[10434,15647]	[13466,20007]	[13735,19153]
Remittances			
Receiving any remittance	0.09	0.1	0.17
	[0.07,0.10]	[0.08,0.11]	[0.15,0.19]
Avg. Remittance Amount per HH (PKR)	3,301	3,949	6,658
	[2294,4309]	[2751,,5146]	[5317,8000]
Share of remittances in Monthly HH Consumption Expenditure	0.02	0.02	0.03
	[0.01,0.02]	[0.01,0.02]	[0.03,0.04]
Share of remittances in Monthly HH Consumption Expenditure (Only remittance receiving HHs)	0.17	0.16	0.18
	[0.14,0.20]	[0.14,0.19]	[0.16,0.20]
N	166	166	166

95% confidence intervals in brackets

From table 17 we see that households in areas that witnessed low, moderate and high anomalous flooding do not differ substantially in terms of savings levels. We do, however, observe that households in the high anomalistic flooding category reported significantly higher rates of owing money to an external source, and have higher levels of debt at the end of the year following the floods. Further, households in the high anomalistic flooding category also had a higher rate of remittance receipts, and amounts of money received as remittance, on average.

The descriptive statistics may provide some avenues for future research. First, the lower levels of debt and higher levels of migration in areas with higher likely past exposure to flood may suggest a link: in areas with higher anticipation of floods, households may be using migration as a means to reduce the extent of household debt incurred. In contrast, in the case of more unanticipated flooding, households may not be prepared or able to migrate out to smooth household income/consumption, and therefore rely on loans. Secondly, the higher share of households receiving remittances in areas of more flooding anomaly could be because remittances respond not only to shocks suffered by the recipient household, but also to the extent to which such shocks are exceptional or unprecedented. This could in turn be because households hit by recurrent floods are, over time, less likely to invoke sympathy and financial help from friends/relatives, and therefore have to fend for themselves by migrating. In contrast households that are experiencing anomalous flooding, and are also less mobile, can only depend on help from households outside the community, through remittances. These hypotheses merit more detailed study in future research (The association between flooding anomaly and remittance receipts is also commented upon in Chapter 4).

6.5.7 Robustness checks

I perform additional robustness tests for the indices of flooding exposure and flooding anomaly and find that the main results are robust to the following specifications:

i. The linear transformation of the Flood Exposure Index (FEI): Recall (from Equations 1 and 2) that the Flood Exposure Index developed and used in this chapter is defined as: $FEI_c = \frac{\sum_{i=0}^{n} FEI_{hh}}{n}$

Where $FEI_{hh} = \log_e [1 + (\text{DepthScore X DurationScore})]$

As a robustness test I estimate the results using an alternate index of flooding exposure $FEI_{1c} = \frac{\sum_{i=0}^{n} FEI_1}{n}$ where, FEI_1 = (DepthScore X DurationScore).

I find that the main results (for household and individual level migration) are robust to this alternate specification using the linear transformation of the Flooding Exposure Index (shown in Appendix 6.1).

ii. Including Depth and Duration Scores as separate regressors: In equations 1 and 2 I develop the Index of Flooding Exposure as a combination of the depth and duration (of floodwater) scores. I additionally use the (community-level average of) depth and duration scores as separate regressors and find that the positive effects of flooding exposure on household and individual migration are driven by both, the depth and the duration of floodwaters in the house (results shown in Appendix 6.2).

iii. Household-level Flood Exposure Index: I find that the results presented in this chapter are robust to measuring flooding exposure at the household level, i.e. as $FEI_{hh} = \log_e [1 + (\text{DepthScore X DurationScore})]$. These results are presented in Appendix 6.3.

iv. I find that the results of the effect of the Flooding Anomaly Index, constituted by combining two sub-indices (the standardised index of rainfall deviation and the standardised community distance from the nearest river) on migration is not driven by any one of the sub-indices alone. Appendix 6.4 6.1 presents results of probit estimations where I include both sub-indices as separate regressors, showing that both exert a significant negative effect on migration.

v. I also examine if the association between the Flooding Anomaly Index and migration is non-linear, by including the square of the FAI as an additional regressor in the estimations. I find that in most cases the effect of the FAI on migration is Linear as the coefficient on the FAI-squared term is not significant. These results are presented in Appendix 6.5.

I also show that the effects of the Flooding Anomaly Index are robust to the inclusion of a wide array of controls, and following Altonji *et al.* (2005) and Miguel and Bellows (2009), show (in 6.5.3) that the level of selection on unobservables required to nullify these effects are extremely high.

Finally, I show that the effects of the Flooding Anomaly Index are negative, significant and of similar magnitude for both, household and individual migration (sections 6.5.1 and 6.5.2).

6.6 Conclusions

So far the literature on natural disasters and migration has focused on the role of disaster incidence and in some cases, severity, in determining short and long-term migration. The degree of shock uncertainty, represented by a measure of anomaly, or deviation from past shocks levels, and its role in influencing post-disaster decisions, in particular migration, has been understudied. This chapter attempts to make a key contribution to the literature on natural disasters and coping strategies. Specifically the chapter sets out to understand how post-flood household migration depended on whether flooding was of a more routine, or alternatively of a surprise nature, during the 2010 floods in Pakistan. I develop and implement an innovative means to proxy the degree of flooding anomaly, based on likely past exposure to floods. Using this measure, I find that while flooding exposure per se increases the likelihood of household and individual migration, more anomalistic flooding in fact has a negative effect on household and individual level short-term migration. This connects with the earlier discussion on ambiguity aversion associated; it underlies the hesitation and inability to migrate in the aftermath of an unknown event (floods). For households and individuals who faced no or very low flooding in the past compared to 2010, the odds of success/survival by migrating are unknown, because they probably had no occasion to discover what migration entails. This is possibly why in areas hit by anomalous floods even otherwise mobile groups (youth, men, landless) were less likely to migrate.

In other words, while short-term migration increases with the realisation of more intensive flooding risk, it decreases with the realisation of disaster uncertainty. This is a key contribution to the hitherto understudied role of the degree of novelty/anomaly of natural disasters in determining household behaviour. However, it should be noted that these effects pertain to a very specific type of short-term migration that is studied in this chapter, which largely consists of the movements of complete households (and not just specific individual/s) probably only to escape and wait out the floods. These results, while important for understanding short-term mobility and disaster response may not be generalizable to other, more commonly observed and studied forms of migration.

Following the 2010 floods, affected populations in Pakistan undertook a very large scale of (at least) short term migration. This typically consisted of entire families moving out of their flood affected villages, and most members returning home within a year of the floods. More anomalous flooding led to lower rates of household and individual migration, particularly among rural communities, and among landless, own land-cultivating, male-headed and younger households. These groups tend to be more mobile than say, older, female-headed and landlord households (whose migration decisions are not affected by the degree of flood anomaly). It could be the case that groups of households that are less mobile or inclined to migrate are similarly immobile whether residing in areas of recurrent or anomalous flooding. However, in areas of more recurrent flooding mobile groups may have a higher expectation of flooding, and the consequent need to migrate, compared to areas with lower past exposure to floods. These groups may therefore invest more in the material and non-material enablers of migration to prepare for such an eventuality as and when it unfolds, and may not be strongly averse to migration as a means to cope. On the other hand, people in areas with lower historical exposure to floods may not have ever needed to make such investments and preparation. I hypothesise that such pre-positioning of material and non-material resources to deploy towards undertaking migration may be at the core of why more anomalous flooding reduces the propensity to migrate, particularly among population groups that are likely more mobile than others. Data constraints prevent me from testing this more formally.

The results on the effects of flooding anomaly on migration are robust to controlling for access to flood relief transfers; selective or differential access to flood relief which may be used to finance post-flood migration does not conflate the strong negative relationship between flooding anomaly and migration decisions. I also find descriptive evidence that shows that areas of more anomalous flooding had, on average, higher access to remittances and higher rates of indebtedness in the post-flood period. This could suggest that remittances, particularly when motivated by altruism and risk-sharing, respond not only to the severity of shocks that households witness but also how unprecedented (and therefore difficult to cope with) such shocks may be. The higher levels of indebtedness in communities facing anomalous flooding could mean that without the familiarity with migration as a coping response, and the necessary preparation to undertake it, such households had to rely more often on informal debt to cope – which is available in all communities and requires very low (if any) pre-positioning of resources or networks. Future research should specifically explore if any causal links underlie such a hypothesis, and more broadly, the precise mechanisms through which flooding anomaly affects migration.

Chapter 7. Conclusions

This thesis has covered much ground on household behaviour at the intersection of natural disaster shocks, conflict, and public and private transfers, in the aftermath of the 2010 floods in Pakistan. Chapters 3 to 6 have each engaged with specific microeconomic relationships at this intersection, which have hitherto not been studied in much detail, particularly in Pakistan. In the process I have attempted to make contributions to the academic literature on this topic along empirical and country-specific dimensions, as well as to policy debates.

Empirical Contributions: Chapters 3 and 4 of this thesis specifically engage with measuring and identifying the causal effects of micro-level conflict exposure on households' access to transfers. This is based on a detailed mapping of conflict events data to the lowest level possible (the tehsil, in Pakistan), through the process described in Chapter 2.

While contributing to the vast and growing number of studies on the empirical analyses of conflict at the micro-level in general, Chapter 3 also describes a unique empirical method to identify areas with the likely presence of rebel (Taliban) groups, which may not be the same as areas where violence occurs. This method is based on the analysis of residuals from the community-level estimation of girls' primary schooling, to isolate the effect of Taliban presence as an unobserved, omitted variable that lowers girls schooling rates. Inspired by macroeconomic analyses of Total Factor Productivity growth through the 'Solow residual' (Solow: 1956, 1957), this technique, to the best of my knowledge, has not previously been used in the microeconomic analysis of conflict to identify rebel group presence.

In Chapter 4, I use a microeconomic lens to study the relationship between conflict exposure and remittance receipts and find that my empirical results fill a gap in the literature, currently dominated by country-level studies.

Chapter 5 alludes to the trade-off between material and physical security, and finds empirical evidence that speaks to this literature.

Finally, in Chapter 6 I develop an Index of Flooding Anomaly as a proxy measure of the level of uncertainty of flooding shocks, based on the likely past exposure of communities to floods. This helps me find empirical evidence for the effect of uncertainty on household migration, a subject that has received little theoretical and almost no empirical attention.

Country-specific Contributions: Pakistan, while being a vast and varied country in which millions of people face multiple shocks and vulnerabilities, has generally not been studied in very much detail in terms of the intersection of vulnerabilities. Each chapter of this chapter attempts to contribute to remedying this paucity. Chapter 2 is based on the first ever systematic compilation and analysis of the conflict events timeline of the South Asia Terrorism Portal for Pakistan. This is a valuable resource that can help other researchers study micro-level conflict dynamics in Pakistan over the critical phase of its history between 2001 and 2010.

While conflict in Pakistan received substantial attention in International Relations, Security Studies and Terrorism Studies disciplines, there is astonishingly no evidence on the microeconomic impact of exposure to conflict, on households and individuals (to the best of my knowledge). Studying conflict through a microeconomic lens is the biggest intended contribution (to the study of Pakistan) of this thesis. Chapter 3 provides a detailed assessment of how conflict affects access to two large cash transfer programmes run by the Government of Pakistan, a subject that despite being of much interest to scholars and policy practitioners in the country, is not informed by rigorous analysis.

Finally, while the subject of gun ownership in Pakistan is hotly debated from drawing rooms in Lahore to the Pentagon, there is very little systematic evidence of the determinants or correlates of gun ownership in Pakistan. Despite being curtailed by very limited data, Chapter 5 attempts to examine what household-level factors are associated with gun ownership. It is hoped that these specific parts of the thesis will be of much interest and use to scholars of Pakistan across disciplines.

Policy Implications: Several chapters of this thesis seek to answer questions relevant for policy, and therefore to government and international donor agencies. Chapter 3 specifically examines how conflict affects the performance of two large donor-funded and government-run cash transfer programmes, the Citizens Damage Compensation Programme and the Benazir Income Support Programme and cautions against the enthusiasm to use cash transfers as a means of achieving political ends. This is because cash transfers may themselves become the subject of rebel groups' suspicion and attacks. Chapter 4 finds that households' access to remittances is also reduced due to conflict, particularly among households without bank accounts who are more likely to rely on informal means of money transfer. Taken together, these two chapters point to the increasing isolation of communities affected by conflict from both public and private transfers. They also caution against the oversimplified assumption that money generated from outside conflict-affected areas can be infused, through public or private channels, into such communities without addressing the on-ground realities that are associated with conflict and also encumber the provision of transfers. By doing so, they also re-emphasises the centrality of effective governance through (among others) security, police and civil society reform to make other interventions, cash transfers and private remittances in this case, possible to rollout. Equally, the chapters suggest that any innovations in financial inclusion through the spread of Information Technology that can enable direct electronic transfers of funds may be able to circumvent at least some of the challenges that money transfers face in conflict-affected areas.

Chapter 5 has important lessons for the likely unintended consequences of aid through civilian militarisation by the use of aid money for the purchase of guns. The chapter's findings make a case for improving the public provision of security in displacement camps. Failing such provisions, materially well-off but physically insecure households may feel the need to buy guns for their own security. Finally, Chapter 6 makes a case for policy makers to consider not only the level of disaster exposure faced by households, but also how anomalous such disasters are likely to have been, as the latter factor may have a significant effect on the extent to, and ways in which, households can cope.

Implications and Suggestions for Future Research

This thesis has attempted to cover a wide range of topics within a fixed period of time. While it has benefited from access to a rich household survey dataset, detailed conflict events timeline and satellite data, in some instances more detailed analysis has been curtailed by the paucity of additional data. Future research that is specifically aimed at the topics explored in this thesis should attempt to use and integrate such data for analysis.

In this thesis I have created a conflict-events dataset for Pakistan from the South Asia Terrorism Portal that locates conflict events and fatalities down to the tehsil level. While this is the most micro-level conflict event dataset available yet, and as highlighted earlier, Chapters 3 – 5 of this thesis are perhaps among the first microeconomic analyses of the effects of conflict on households in Pakistan, future research would benefit immensely from the availability of conflict events data at more granular levels, such as the Union Council, or even village/ community. This may require dedicated collection of primary data of conflict events during household surveys, or a concerted effort to locate more precisely where violent conflict occurs.

Chapter 4 shows that conflict exposure reduces household remittance receipts, as a result of the insecurity of informal financial transfers and a dampening of investment incentives, brought upon by conflict. However, the speculation on the effects of conflict on investment-driven remittances are indirect; derived from the assumed (and plausible) increasing likelihood of households in higher food consumption quintiles to use remittances to invest. Future research should specifically record the use of remittance receipts across consumption and investment heads, to examine the effects more precisely. A record of the source of remittances (domestic/ foreign) can also potentially help identify which types of remittances are most affected by conflict.

While Chapter 6 shows that the level of shock anomaly matters to post-shock household/ individual behaviour, the analysis is based on the comparison of the 2010 floods with the likely exposure to flooding in the past, at the community level. This is because despite multiple attempts to locate data on the micro-level exposure to floods in the past, such data were not available. A systematic (and publically available) record of flooding history at the community or even Union Council level would enable the direct observation of the frequency of flooding occurrence in a community, and would be a resource worth investing in, for analytical and policy priorities alike.

Finally, data on the exact mode of payments used for receiving both public and private transfers can provide insights into the specific routes which the Taliban-affiliate groups are likely to block or threaten, which results in the financial isolation of households due to conflict (as shown in Chapters 3 and 4). Future research should also explore how armed group presence affects the demand and the supply of cash transfers in terms of the ability of households to seek, and that of the last-mile bureaucrat to deliver cash transfers. It is hoped that some of these pointers will enable a fuller understanding of the microeconomic dynamics in the context of complex emergencies in the future.

Bibliography

Abbasi, H. A. (2013) Trading bullets in a gun-friendly nation. *Dawn*. 09 December 2013.

Adams, R.H. and J. He (1995) *Sources of Income Inequality and Poverty in Rural Pakistan*. Washington, DC: International Food Policy Research Institute (IFPRI) Research Report 102.

Afram, G. G. (2012). *The remittances market in India: Opportunities, challenges and policy options*.Washington, DC: World Bank.

Agarwal, S., J. C. Driscoll, X. Gabaix, and D. Laibson (2008) Learning in the credit card market. NBER Working Paper, (13822), February 2008.

Ahmed, A. (2013) *The Thistle and the Drone: How America's War on Terror became a Global War on Tribal Islam*. Washington DC: The Brookings Institution.

Ahmed, I. I. (2000) 'Remittances and Their Economic Impact in Postwar Somaliland', *Disasters*, 24(4), pp. 380–89.

Ahmed, J and I.M. Zarzoso (2013) *Blessing or Curse: The stabilizing role of remittances, Foreign aid and FDI to Pakistan.* May 2013, Discussion papers, Center for European Governance and Economic Development Research, No. 153.

Akresh, R., and D. De Walque, D. (2008). Armed conflict and schooling: Evidence from the 1994 Rwandan genocide. *World Bank Policy Research Working Paper Series, Vol*. -. Available at SSRN: http://ssrn.com/abstract=1149109

Al-Ali, N., R. Black and K. Koser (2001) 'Refugees and Transnationalism: the Experience of Bosnians and Eritreans in Europe', *Journal of Ethnic and Migration Studies*, 27, pp. 615–35.

Alavi, H. (1988) "Pakistan and Islam:Ethnicity and Ideology." In Halliday, F. and H. Alavi (Eds.) *State and Ideology in the Middle East and Pakistan*, 64-111. New York: Monthly Review Press.

Albarran, P. and O. Attanasio (2002) "Do Public Transfers Crowd Out Private Transfers? Evidence from a Randomized Experiment in Mexico." UNU/ WIDER Discussion Paper no. 2002/6, 2002.

Alderman, H. and M. Garcia (1993) "Poverty, household food security, and nutrition in rural Pakistan" Washington, DC: International Food Policy Research Institute (IFPRI) Research Report 96.

Alderman, H., and C. Paxson, (1994) Do the poor insure? A synthesis of the literature on risk and consumption in developing countries. In E. Bacha (Ed.), *Economics in a Changing World*. New York: St. Martin's.

Alderman, H., Hoddinott, J. and Kinsey, B. (2006) Long Term Consequences of Early Childhood Malnutrition, *Oxford Economic Papers*, 58 (3): 450-474.

Alesina, A., A. Devleeschauwer, W. Easterly, S. Kurlat and R. Wacziarg (2003) Fractionalization. *Journal of Economic Growth*. Springer, vol. 8(2), pages 155-94, June.

Alesina, A., R. Baqir and W. Easterly (1999) Public Goods And Ethnic Divisions. *The Quarterly Journal of Economics*, MIT Press, vol. 114(4), pages 1243-1284, November.

Alpers, P. and M. Wilson (2015) *Pakistan – Gun Facts, Figures and the Law*. Sydney School of Public Health, The University of Sydney. GunPolicy.org, 15 June. Accessed 21 July 2015 at: http://www.gunpolicy.org/firearms/region/pakistan

Altonji, J.G., T.E. Elder, and C.R. Taber (2005) "Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools." *Journal of Political Economy*, 113(1): 151-184.

Amjad R., M. Irfan, and G.M. Arif (2013). *How to Increase Formal Inflows of Remittances: An Analysis of the Remittance Market in Pakistan.* Working Paper, A joint publication of Lahore School of Economics (LSE), International Growth Center (IGC) and the Pakistan Institute of Development Economics (PIDE).

Angelucci, M (2004) "Aid and Migration: An Analysis of the Impact of Progresa on the Timing and Size of Labour Migration," IZA Discussion Papers 1187, Institute for the Study of Labor (IZA).

Angelucci, M. (2013) "Migration and Financial Constraints: Evidence from Mexico," IZA Discussion Papers 7726, Institute for the Study of Labor (IZA).

Ballard, R. (2003) *A Background Report on the Operation of Informal Value Transfer Systems (Hawala).* Available at: casas.org.uk/papers/pdfpapers/hawala.pdf.

Ballard, R. (2005) 'Coalitions of Reciprocity and the Maintenance of Financial Integrity within Informal Value Transmission Systems: The Operational Dynamics of Contemporary Hawala Networks', *Journal of Banking Regulation*, 6(4), pp. 319–52.

Ballentine, K. and H. Nitzschke, 2003. *Beyond Greed and Grievance: Policy Lessons from Studies in the Political Economy of Armed Conflict.* New York: International Peace Academy Policy Report.

Banerjee, A. and E. Duflo (2011) *Poor Economics: Rethinking Poverty and the Ways to End It.* New Delhi: Random House India.

Banerjee, A., L. Iyer and R. Somanathan (2005) History, Social Divisions, and Public Goods in Rural India. *Journal of the European Economic Association*, Vol. 3, No. 2/3, pp. 639-647.

Bangalore, S. and F.H. Messerli (2013). Gun ownership and firearm-related deaths. The *American Journal of Medicine*, 126: 873 - 6; http://dx.doi.org/10.1016/j.amjmed.2013.04.012; PMID: 24054955

Barnett, J. and R. Jones (2002): "Forced migration: the influence of environmental security", *Global Change*, 7 (4), 3.

Beath, A., F. Christia and R. Enikolopov (2012) "Winning hearts and minds through development? Evidence from a field experiment in Afghanistan," *Policy Research Working Paper Series* 6129, The World Bank.

Behuria, A.K. (2007) "Fighting the Taliban: Pakistan at War with Itself." *Australian Journal of International Affairs* 61, no. 4 (December): 531-532.

Belasen, A.R. and S.W. Polachek (2013), "Migration as a Result of Environmental Disasters." In K. Zimmerman and A. Constant, ed., *International Handbook on the Economics of Migration*, Eward Elgar Publishing: *forthcoming*.

Bellows, J. and E. Miguel (2009) "War and Local Collective Action in Sierra Leone." *Journal of Public Economics*, 93(11): 1144-1157.

Berman, E., J. N. Shapiro, and J. H. Felter (2008): "Can Hearts and Minds Be Bought? The Economics of Counterinsurgency in Iraq," Journal of Political Economy, Vol. 119, No. 4 (August 2011), pp. 766-819.

Black, R., S. R. G. Bennett, S. M. Thomas and J. R. Beddington (2011) Climate Change: Migration as Adaptation. *Nature* 478, 447–449 (27 October 2011) doi:10.1038/478477a Published online 20 October 2011

Blattman, C. (2014) Show Them the Money: Why Giving Cash Helps Alleviate Poverty. *Foreign Affairs*. May/June 2014.

Bohra-Mishra, P., M. Oppenheimer and S. M. Hsiang (2014) Nonlinear permanent migration response to climatic variations but minimal response to disasters. *Proceedings of the National Academy of Sciences of the United States of America (PNAS)* 2014 111 (27) 9780-9785; published ahead of print June 23, 2014, doi:10.1073/pnas.1317166111

Bokhari, L. (2011) Radicalization, Political Violence, and Militancy. In Stephen P. Cohen (Ed.) *The Future of Pakistan*. Washington DC: The Brookings Institution.

Boone, C. (1994). States and ruling classes in postcolonial Africa: the enduring contradictions of power. In J. Migdal, A. Kohli, & V. Shue (Eds.), *State power and social forces: domination and transformation in the Third World* (pp. 108–139). New York: Cambridge University Press.

Bose, S. (2011) *Dead Reckoning: Memories of the 1971 Bangladesh War.* New York: Columbia University Press.

Brown V. and D. Rassler (2013) *Fountainhead of Jihad: The Haqqani Nexus, 1973-2012*. London: C. Hurst & Co.

Burke, J. (2004) Think Again: Al Qaeda. *Foreign Policy*: May 1, 2004.

Campbell, E. and J. Kakusu (2006) 'Congolese Refugee Livelihoods in Nairobi and the Prospects of Legal, Local Integration', *Refugee Survey Quarterly*.

Carling, J, M.B. Erdal, and C. Horst (2012) 'How does conflict in migrants' country of origin affect remittance-sending? Financial priorities and transnational obligations among Somalis and Pakistanis in Norway.' International Migration Review, 46(2): 283-309.

Case, A., C. Paxson, and J. Ableidinger (2004) Orphans in Africa: Parental Death, Poverty, and School Enrollment. *Demography* 41(3): 483-508.

Castaldo, A., P. Deshingkar, and A. McKay (2012) Internal migration, remittances and poverty: Evidence from Ghana and India. *Falmer: University of Sussex, Migrating Out Of Poverty Working Paper*, (7).

Clark, G. and S. Wallsten (2004) *Do Remittances Protect Households in Developing Countries against Shocks? Evidence From a Natural Disaster in Jamaica.* Washington DC: World Bank.

Clay, E. and C. Benson (2006) 'Aftershocks: Natural Disaster Risk and Economic Development Policy', in P. Randade (ed.), *Natural Disaster Management and Preparedness*. Hyderabad: ICFAI University Press.

Cohen, S. P. (2004) *The Idea of Pakistan*. Washington, DC: Brookings Institution.

Cohen, S. P. (2011) *The Future of Pakistan*. Washington DC: The Brookings Institution

Collier, P. (2000) *Economic Causes of Civil Conflict and Their Implications for Policy*. The World Bank, Washington DC.

Collier, P., and A. Hoeffler (2007) "Unintended Consequences: Does Aid Promote Arms Races?" *Oxford Bulletin of Economics and Statistics* 69 (1): 1–27

Collier, P., and A. Hoeffler (2004) "Greed and Grievance in Civil War." *Oxford Economic Papers* 56:563–95.

Connell, J. and R. Brown (2005) '*Remittances in the Pacific: An Overview*', Pacific Studies Series of the Asian Development Bank. Manila: ADB.

Constable, P. (2011) *Playing with Fire: Pakistan at War with Itself.* New York: Random House.

Cook, Philip, Mark Moore, and Anthony Braga (2001) *Gun Control*. Working Paper Series. Durham, NC: Terry Sandford Institute of Public Policy, Duke University

Crost, B., J. Felter and P. Johnston. 2014. Aid Under Fire: Development Projects and Civil Conflict. *American Economic Review* 104(6): 1833-56

Dawn (2010) BISP Office, Minister's House Attacked in Turbat. Dawn News Online. Published on 09 August 2010 at: http://www.dawn.com/news/951679/bisp-office-minister-s-house-attacked-with-grenades Retrieved on 14 October 2014.

de Haan A. (1999) 'Livelihoods and Poverty: The Role of Migration – A Critical Review of the Migration Literature, *Journal of Development Studies*, Vol. 36, No.2, pp. 1-47.

De Mesquita, E. B., C.C.Fair, J. Jordan, R.B. Rais, and J. Shapiro (2013) *The BFRS Political Violence in Pakistan Dataset.* Empirical Studies of Conflict Project. New Jersey: Princeton University.

De, P. K. and D. Ratha (2012): Impact of remittances on household income, asset and human capital: evidence from Sri Lanka, *Migration and Development*, 1:1, 163-179

Dehejia, R.H. and S. Wahba, (1998) Propensity Score Matching Methods for Non-Experimental Causal Studies. *NBER Working Paper* No. W6829, Dec., Boston

del Ninno, Carlo; Paul Dorosh, Lisa Smith and Dilip Roy (2001) *The 1998 Floods in Bangladesh: Disaster Impact, Household Coping Strategies and Responses.* Research Report 122, International Food Policy Research Institute. Washington, D.C.

Dercon, S. (2006) "Vulnerability: a micro perspective," QEH Working Papers 149, Queen Elizabeth House, University of Oxford.

Deshingkar, P. (2006) Internal Migration, Poverty and Development In Asia, *ODI Briefing Paper*. London: ODI.

Drabo, A. and Mbaye, L.M. (2011) "Climate Change, Natural Disasters and Migration: An Empirical Analysis in Developing Countries," *IZA Discussion Papers* 5927, Institute for the Study of Labor (IZA).

Dube, O., and J. F. Vargas (2007): *"Commodity Price Shocks and Civil Conflict: Evidence from Colombia,"* CERAC Working Paper No. 2.

EIU (Economist Intelligence Unit). 2002. *Small Arms, Armed Violence and Foreign Direct Investment*. Background paper. Geneva: Small Arms Survey and FAFO.

Ellsberg, D. (1961). 'Risk, ambiguity, and the Savage axioms', *Quarterly Journal of Economics*, vol. 75(4), pp. 643–69.

El-Sakka, M. and McNabb, R. (1999) The Macroeconomic Determinants of Emigrant Remittances. *World Development*, 27(8), pp. 1493-1502.

Epstein, L.G. (1999) A definition of uncertainty aversion. *Review of Economic Studies*. Vol 66 (1999), 579 – 608

Etner, J., Jeleva, M. and Tallon, J.-M. (2012). 'Decision theory under uncertainty', Journal of *Economic Surveys*, vol. 26(2), pp. 234–70.

Eynde, O. V. (2011) "Targets of Violence: Evidence from India's Naxalite Conflict." http://personal.lse.ac.uk/vandeney/Targets_of_Violence.pdf

Fafchamps, M. (2003) *Rural Poverty, Risk, and Development*. Elgar Publishing.

Fagen, P.W. and M. Bump (2006) *Remittances in Conflict and Crises: How Remittances Sustain Livelihoods in War, Crises, and Transitions to Peace.* Policy Paper. The Security-Development Nexus Program. International Peace Academy, Georgetown University, Washington, DC.

Fair, C.C. (2011) Addressing Fundamental Challenges. In Stephen P. Cohen (Ed.) *The Future of Pakistan*. Washington DC: The Brookings Institution

Fearon, J. and D. Laitin (1996) "Explaining Interethnic Cooperation." *American Political Science Review* 90 (4): 715 – 735.

Ferriman, A. (2002) 'Palestinian Territories Face Huge Burden of Disability.' *British Medical Journal*, Vol. 324, No. 9.

Findley, S. E. (1994) Does drought increase migration? A study of migration from rural Mali during the 1983–1985 drought. *International Migration Review* 28(3):539-553.

Friedman, J. (2012). Tools of the trade: The covariate balanced propensity score. World Bank Development Impact Blog. Available at:

http://blogs.worldbank.org/impactevaluations/tools-of-the-trade-the-covariate-balanced-propensity-score [Accessed 10 Jun. 2013].

Gallagher, J. (2014) Learning about an infrequent event: Evidence from flood insurance take-up in the US. *American Economic Journal: Applied*, 6(3): 206-233.

Gayer, L. (2007) "Guns, Slums, and 'Yellow Devils': A Genealogy of Urban Conflicts in Karachi, Pakistan." *Modern Asian Studies* 41, no.3: 515-44.

Gazdar H. (2003) *A review of Migration Issues in Pakistan'*, Migration Development and Pro-poor Policy Changes. Dhaka.

GCPEA (2014) Education Under Attack 2014: Pakistan Country Profile. New York: Global Coalition to Protect Education from Attack. Accessed Online at http://protectingeducation.org/sites/default/files/documents/eua_2014_country_profiles_pakistan.pdf on 03 August 2015

Gellert, G. (2006) 'Hurricane Stan Lifts the Lid on Guatemala's Vulnerability', in *World Disasters Report* 2006. Geneva: IFRC.

Ghirardato, P. and J. N. Katz (2000) *"Indecision Theory: Explaining Selective Abstention in Multiple Elections,"* Social Science Working Paper 1106, Caltech, November 2000.

Gilboa, I. and Schmeidler, D. (1989). 'Maximin expected utility with non-unique prior', *Journal of Mathematical Economics*. Vol 18(2). Pp. 141 – 153.

Gioli, G., T. Khan, and J. Scheffran (2013) Remittances and Community Resilience to Conflict and Environmental Hazards in Northwestern Pakistan. In Rodima-Taylor, D.

(Ed.) *Remittance Flows to Post-Conflict States: Perspectives on Human Security and Development*. Pardee Center Task Force Report. Boston University, Boston.

Gompert, D. C., T. K. Kelly, B. S. Lawson, M. Parker, and K. Colloton (2009): Reconstruction Under Fire: Unifying Civil and Military Counterinsurgency. RAND Corporation.

Goudie, Andrew and Bilin Neyapti (1999) *Conflict and Growth in Africa*: Vol. 3 (Southern Africa). Paris: Development Centre for the OECD.

Government of Pakistan (2010) *Final Report of the Panel of Economists: Medium-Term Development Imperatives and Strategy for Pakistan.* Planning Commission, Government of Pakistan, Islamabad.

Grare, F. (2013) *Balochistan: The State versus the Nation.* Washington, DC: Carnegie Endowment for International Peace.

Gray, C. and R. Bilsborrow (2014) Consequences of out-migration for land use in rural Ecuador. *Land Use Policy* 36: 182–191.

Gray, C.L. and V. Muller (2012) "Drought and population mobility in rural Ethiopia" *World Development* 40 (1), 134 – 145

Guiteras, R., A. Jina and A.M. Mobarak (2015) Satellites, Self-reports, and Submersion: Exposure to Floods in Bangladesh. Maryland Population Research Center Working Paper PWP-MPRC-2015-001, and IGC Working Paper.

Gul, I. (2009) *The Most Dangerous Place: Pakistan's Lawless Frontier.* New Delhi: Penguin Books India.

Gunaratna, R. and K. Iqbal (2011) *Pakistan: Terrorism Ground Zero.* London: Reaktion Books.

Gundel, J. (2002) ''The Migration–Development Nexus: Somalia Case Study.'' *International Migration* 40(5):255–281

Haas, H. (2010). The Internal Dynamics of Migraton Processes: A theoretical inquiry. *Journal of Ethnic and Migration Studies*. Vol 36(10), pages 1587-1617.

Halliday, T. (2006) "Migration, Risk, and Liquidity Constraints in El Salvador," *Economic Development and Cultural Change*, University of Chicago Press, vol. 54(4), pages 893-925, July.

Hemenway, D. and M. Miller (2000) 'Firearm Availability and Homicide Rates Across 26 High-Income Countries.' *Journal of Trauma*, Vol. 49, pp. 985–88.

Horst, C. (2006) *Transnational Nomads: How Somalis Cope with Refugee Life in the Dadaab Camps of Kenya.* Oxford: Berghahn.

Horst, C. (2008) ''The Transnational Political Engagements of Refugees: Remittance Sending Practices Amongst Somalis in Norway.'' *Conflict, Security and Development* 8(3):317– 339.

Houze Jr., R. A., K. L. Rasmussen, S. Medina, S. R. Brodzik, and U. Romatschke (2011) Anomalous Atmospheric Events Leading to the Summer 2010 Floods in Pakistan. *Bullutin of the American Meteorological Society*, Vol. 92, pp. 291–298.

Hunt, S., S. O'Leary, T. Newton-Lewis and Z. Ali (2011) *Evaluating Implementation of Pakistan's Citizens Damage Compensation Programme (Phase I)*. Oxford: Oxford Policy Management Ltd.

Hunter, L. M., Murray, S. and Riosmena, F. (2013), Rainfall Patterns and U.S. Migration from Rural Mexico. *International Migration Review*, 47: 874–909. doi: 10.1111/imre.12051

Hysenbegasi, A. and S. Pozo. (2002) *What Prompts Workers to Remit? Evidence Using a Panel of Latin American and Caribbean Nations.* Working Paper, Western Michigan University

Ibáñez, A. M. and Moya, A. (2006) The Impact of Intra-State Conflict on Economic Welfare and Consumption Smoothing: Empirical Evidence for the Displaced Population in Colombia. *HiCN Working Paper* No. 23, Households in Conflict Network

ICG (2006) Pakistan's tribal Areas: Appeasing the Militants. Asia Report No. 125 11 December 2006. Brussels: International Crisis Group. Accessed at: http://www.crisisgroup.org/en/regions/asia/south-asia/pakistan/125-pakistans-tribal-areas-appeasing-the-militants.aspx on 27 August 2013.

ICG (2013) *Pakistan: Countering Militancy in PATA*, Asia Report No. 242, 15 January 2013, 24. Brussels: International Crisis Group. Accessed at: http://www.crisisgroup.org/~/media/Files/asia/south-asia/pakistan/242-pakistan-countering-militancy-in-pata.pdf on 27 May 2013.

IGC (2015) *Reclaiming prosperity in Khyber-Pakhtunkhwa: A medium term strategy for inclusive growth - Full report*. International Growth Centre, London.

Imai, K. and M. Ratkovic. (2014). ``Covariate Balancing Propensity Score.'' *Journal of the Royal Statistical Society*, Series B (Statistical Methodology), Vol. 76, No. 1 (January), pp. 243-246.

IOM (2003) *World Migration 2003: Managing Migration – Challenges and Responses for People on the Move*. Geneva: IOM

IOM (2007): "Migration and the Environment", IOM (International Organization for Migration), Technical Report. Geneva: International Organization for Migration

Iyer, L. (2010) Direct versus Indirect Colonial Rule in India: Long-term Consequences. *Review of Economics and Statistics*, 92 (4), 693-713.

Jaffrelot, C. (2002) *Pakistan: Nationalism without A Nation.* London: Zed Books Ltd.

Jalal, A. (2009). *Partisans of Allah: Jihad in South Asia*. Harvard University Press.

James, C. (2002) 'Crime Engulfs Economies in the Caribbean.' *Financial Times*. 19 July

Jefferson, C. and A. Urquhart (2002) *The Impact of Small Arms in Tanzania: Results of a Country Study*. ISS Monograph Series, No 70. Pretoria: Institute for Security Studies.

Jones, O.B. (2009) *Pakistan: Eye of the Storm.* New Haven, CT: Yale University Press.

Jones, S. G. and C. C. Fair (2010) *Counterinsurgency in Pakistan.* Arlington: National Security and Research Division, RAND Corporation.

Juarez, L. (2009) Crowding out of private support to the elderly: Evidence from a demogrant in Mexico. *Journal of Public Economics* 93, 454-463.

Justino, P. (2009) Poverty and Violent Conflict: A Micro-Level Perspective on the Causes and Duration of Warfare. *Journal of Peace Research*. Vol. 46, no. 3, 2009, pp. 315 – 333

Justino, P. (2011) Carrot or Stick? Redistributive Transfers versus Policing in Contexts of Civil Unrest. *IDS Working Papers.* Volume 2011, Issue 382, Article first published online: 30 January 2012.

Justino, P. (2011) Violent Capital and human Capital Accumulation. HiCN Working Paper 99, Households in Conflict Network

Justino, P. (2013) Research and policy implications from a micro-level perspective on the dynamics of conflict, violence and development. In Justino, P., Brück, T. and Verwimp, P. (eds.) *A Micro-Level Perspective on the Dynamics of Conflict, Violence and Development.* Oxford University Press.

Justino, P., T. Brück, and P. Verwimp (Eds.). (2013). *A micro-level perspective on the dynamics of conflict, violence, and development*. OUP Oxford.

Karp, A. (2007) *'Completing the Count: Civilian firearms*.' Small Arms Survey 2007: Guns and the City; Chapter 2 (Annexes 1-5)

Kazianga H. (2006) Motives for household private transfers in Burkina Faso. *Journal of Development Economics* 79, 73-117.

Khan, A. and R. Mussarat (2014) Implications of the Post 9/11 Afghan Insurgency for Pakistan: A Social and Political Perspective.European Academic Research. Vol. I, Issue 12/ March 2014. Available at http://euacademic.org/UploadArticle/389.pdf accessed on 15 September 2015.

Khanna, G. and L. Zimmermann (2014) Guns and Butter? Fighting Violence with the Promise of Development. April 1, 2014. Available at SSRN: http://ssrn.com/abstract=2426832 or http://dx.doi.org/10.2139/ssrn.2426832

Khilji, N.M., and E. M. Zampelli. (1994) "The Fungibility of U.S. Military and Nonmilitary Assistance and the Impacts on Expenditures of Major Aid Recipients." *Journal of Development Economics* 43 (3): 345–62.

Killias, M., J. V. Kesteren, and M. Rindlisbacher (2001) 'Guns, Violent Crime and Suicide in 21 Countries.' *Canadian Journal of Criminology*, Vol. 43, pp. 429–48.

Kleck, G. and M. Gertz (1995) 'Armed Resistance to Crime: The Prevalence and Nature of Self-Defense With a Gun.' *Journal of Criminal Law and Criminology*, Vol. 86, No. 1, pp. 150–87.

Knight, F.V. (1921) *Risk, Uncertainty and Profit*. Houghton Mifflin Company, Boston.

Kobusingye, O. (2002) 'The Effects of SALW Proliferation and Abuse in Gulu District, Uganda: A Public Health Approach.' In BICC Brief 24. *Gender Perspectives on Small Arms and Light Weapons: Regional and International Concerns*. Bonn: BICC

Kochar, A. (1999) Smoothing Consumption by Smoothing Income: Hours-of-Work Responses to Idiosyncratic Agricultural Shocks in Rural India. *Review of Economics and Statistics*, 81(1), 50 – 61.

Kono, D.Y. and G.R. Montinola (2012) The Uses and Abuses of Foreign Aid: Development Aid and Military Spending. *Political Research Quarterly* 66(3) 615–629.

Kosec, K. (2014) “The Child Health Implications of Privatizing Africa’s Urban Water Supply.” *Journal of Health Economics*, Vol. 35, pp. 1-19.

Kosec, K. and C. Mo. (2014) “Productivity Shocks, Aspirations and the Role of Social Protection: Evidence from Rural Pakistan.” Unpublished working paper (currently under review), International Food Policy Research Institute (IFPRI), Washington, DC.

Kugler, A. and M. Yuksel (2008) "Effects of Low-Skilled Immigration on U.S. Natives: Evidence from Hurricane Mitch," NBER Working Papers 14293, National Bureau of Economic Research, Inc.

Lange, M. (2003a) Embedding the colonial state: a comparative-historical analysis of state building and broad-based development in Mauritius. *Social Science History*, *27(3),* 397–423.

Lange, M. (2003b) British Colonial Legacies and Political Development. *World Development* Vol. 32, No. 6, pp. 905 – 992.

Lindley, A. (2007) Remittances in Fragile Settings: A Somali Case Study. *HiCN Working Paper* 27. Households in Conflict Network.

Long, J.S. (1997) *Regression Models for Categorical and Limited Dependent Variables*. Sage Publishing.

Lott, J. and D. Mustard (1997) ‘Crime, Deterrence and Right-to-Carry Concealed Handguns.’ *Journal of Legal Studies*, Vol. 26, pp. 1–33.

Luckham, R., Ahmed, I., Muggah, R. and S. White (2001) Conflict and Poverty in Sub-Saharan Africa: An Assessment of the Issues and Evidence. *IDS Working Paper 128*. Falmer, UK: Institute of Development Studies.

Maimbo, S.M. (Ed.) (2006) Remittances and Economic Development in Somalia: An Overview. Paper No. 38 Conflict Prevention & Reconstruction, Social Development Department, World Bank, Washington, D.C.

Mamdani, M. (1996). *Citizen and subject.* Princeton, NJ: Princeton University Press.

Marchiori, L., J.F. Maystadt and I. Schumacher (2012) The impact of weather anomalies on migration in sub-Saharan Africa. *Journal of Environmental Economics and Management*. Elsevier, vol. 63(3), pages 355-374.

Maystadt, J.F., V. Mueller and A. Sebastian (2014) Environmental Migration and Labor Markets in Nepal. *IFPRI Discussion Paper 01364*. Available at SSRN:http://ssrn.com/abstract=2483979 or http://dx.doi.org/10.2139/ssrn.2483979

Marshall, M. (2010), Frozen jet stream links Pakistan floods, Russian fires, *New Scientist*, Vol. 2773, 6.

McCormick, B. and J. Wahba (2002) "*Return Migration and Geographical Inequality: The Case of Egypt.*" Unpublished paper, University of Southampton.

McKenzie, D. and H. Rapoport (2010) "Self-Selection Patterns in Mexico-U.S. Migration: The Role of Migration Networks," *The Review of Economics and Statistics*, MIT Press, vol. 92(4), pages 811-821, November.

Mesnard, A. (2009) Migration, Violence and Welfare Programmes in Rural Colombia. IFS Working Paper W09/19. London: Institute of Fiscal Studies.

Meyers, D. (1998) Migrant Remittances to Latin America: Reviewing the Literature, *Inter-American Dialogue*, http://www.thedialogue. org/publications/meyers.html.

Meze-Hausken, E. (2000): "Migration caused by climate change: how vulnerable are people in dryland areas?" *Mitigation and Adaptation Strategies for Global Change*, 5, 379–406.

Miguel, E. and M. K. Gugerty (2005) Ethnic Diversity, Social Sanctions, and Public Goods in Kenya. *Journal of Public Economics* 89 (11-12): 2325-2368.

Miguel, E., S. Satyanath, S., and E. Sergenti (2004). Economic shocks and civil conflict: An instrumental variables approach. *Journal of Political Economy*,*112*(4), 725-753.

Mohmand, S. (2011) *Patrons, Brothers and Landlords: Competing for the Vote in Rural Pakistan.* DPhil Thesis. Institute of Development Studies, University of Sussex: UK.

Monsutti, A. (2006) *Afghan Transnational Networks: Looking Beyond Repatriation*. Kabul: Afghanistan Research and Evaluation Unit

Mueller, V., Gray, C. and K. Kosec, (2014) Heat stress increases long-term human migration in rural Pakistan. *Nature Climate Change* 4: 182-185. http://dx.doi.org/10.1038/nclimate2103

Muggah, R. and E. Berman (2001) *Humanitarianism Under Threat: The Humanitarian Impacts of Small Arms and Light Weapons*. Special Report commissioned by the UN Inter-Agency Standing Committee. Geneva/New York: Small Arms Survey/IASC.

Muggah, R. and M. Griffiths (2002) *Reconsidering the Tools of War: Small Arms and Humanitarian Action*. ODI Network Paper 39. London: Overseas Development Institute.

Mukerji, S. (1998) Aversion and Incompleteness of Contractual Form. *The American Economic Review*, Vol. 88, No. 5 (Dec., 1998), pp. 1207-1231

Munshi, K. (2003) "Networks In The Modern Economy: Mexican Migrants In The U.S. Labor Market," *The Quarterly Journal of Economics*, MIT Press, vol. 118(2), pages 549-599, May.

Munshi, K. (2011) "Strength in Numbers: Networks as a Solution to Occupational Traps," *Review of Economic Studies*, Oxford University Press, vol. 78(3), pages 1069-1101.

Murphy, E. (2013) *The Making of Terrorism in Pakistan: Historical and social roots of extremism.* Oxford: Routledge.

NAP (2010). Amendment XVIII (the Eighteenth Amendment) of the Constitution of Pakistan. National Assembly of Pakistan, Islamabad. Available online at http://www.na.gov.pk/uploads/documents/report_constitutional_18th_amend_bill2010_020410_.pdf and accessed on 21 September, 2015.

NASA (2010) *Unusually Intense Monsoon Rains*. Available at: http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=45177. 03 August 2010. Archived from the original on 14 August 2010: https://web.archive.org/web/20100814195434/http:/earthobservatory.nasa.gov/NaturalHazards/view.php?id=45177 Retrieved 09 October 2014.

NASA (2015) Prediction Of Worldwide Energy Resource (POWER) --- Agroclimatology Methodology Version 1.0.2 June 4, 2015. Available online at http://power.larc.nasa.gov/documents/Agroclimatology_Methodology.pdf. Retrieved 05 July 2015.

Nasr, S. V. R. (1996) *Mawdudi and the Making of Islamic Revolution*, Oxford: Oxford University Press.

Nasr, S.V.R. (2002) "Islam, the State and Rise of Sectarian Militancy in Pakistan". In Jaffrelot, C. (Ed.) *Pakistan: Nationalism without A Nation.* London: Zed Books Ltd.

Nawaz, S. (2011) The Clash of Interests and Objectives. In Stephen P. Cohen (Ed.) *The Future of Pakistan*. Washington DC: The Brookings Institution.

Nenova, T., C. T. Niang, and A. Ahmad (2009). *Bringing Finance to Pakistan's Poor: Access to Finance for Small Enterprises and the Underserved*. Washington, DC: World Bank.

Nielsen, R.A., M. G. Findley, Z. S. Davis, T. Candland, and D. L. Nielson (2011) "Foreign Aid Shocks as a Cause of Violent Armed Conflict." *American Journal of Political Science* 55 (2): 219–32.

Nunn, N., and N. Qian (2014) "US Food Aid and Civil Conflict." *American Economic Review*, 104(6): 1630-66.

O'Leary, S., S. Hunt, I. Cheema, M. Jakobsen, M. Marzi, L. Carraro and L. Pellerano (2012) *Citizens Damage Compensation Programme: Evaluation of Phase II: Baseline Report*. Oxford: Oxford Policy Management Ltd.

Oliver-Smith, A. (2009): *Sea level rise and the vulnerability of coastal peoples: responding to the local challenges of global climate change in the 21st century,* InterSections No. 7, United Nations University Institute for Environment and Human Security, Bonn.

OPM (2013) *Citizen's Damage Compensation Programme – Phase II Transfer: Baseline and End line Household Survey Datasets*. Oxford: Oxford Policy Management Ltd. (Access for academic research authorised by National Database Registration Authority, Government of Pakistan, Islamabad).

Orjuela, C. (2008) ''Distant Warriors, Distant Peace Workers? Multiple Diaspora Roles in Sri Lanka's Violent Conflict.'' *Global Networks* 8(4):436–452.

Pakistan Mission to the UN (2014) Pakistan National Report on the implementation of the UN Programme of Action (UNPoA) on Small Arms and Light Weapons (SALW). New York: Pakistan Mission to the United Nations.

Palin, M. (2004) *Himalaya*. London: Weidenfeld & Nicolson

Quisumbing, A., N. Kumar and B. Baulsch (2011) *Evaluating the Long Term Impact of Antipoverty Interventions in Bangladesh: An Overview.* IFPRI Discussion Paper No. 01007. Washington, D.C.: PHND Division, IFPRI.

Rakisits, C. G. P. (2012) Pakistan's twin interrelated challenges: economic development and security, *Australian Journal of International Affairs*, 66:2, 139-154, DOI: 10.1080/10357718.2011.646482

Rao, V. and A.M. Ibanez (2005) The Social Impact of Social Funds in Jamaica: A 'Participatory Econometric' Analysis of Targeting, Collective Action, and Participation in Community-Driven Development. *The Journal of Development Studies*, Vol.41, No.5, July 2005, pp.788 – 838

Rashid, A. (2008) *Descent into Chaos: Pakistan, Afghanistan and the Threat to Global Security*. London: Penguin Books.

Rashid, A. (2012) *Pakistan on the Brink: The Future of Pakistan, Afghanistan and the West.* London: Penguin Books.

Ratha, D. (2003) Workers' Remittances: An Important and Stable Source of External Development Finance. In *Global Development Finance 2003, Striving for Development Finance*. Washington DC: World Bank.

Ratha, D. (2007) *Leveraging Remittances for Development*. MPI Policy Brief. June 2007. Migration Policy Institute, Washington, D.C.

Reno, W. (2002) Arms, Internal War and the Causes of Peace. Background paper for the Social Science Research Council Workshop Series on Law and International Relations, Washington, DC, 6–7 February.

Rodima-Taylor, D. (2013) "Informal" Remittance Systems and Post-Conflict Development. In Rodima-Taylor, D. (Ed.) *Remittance Flows to Post-Conflict States: Perspectives on Human Security and Development*. Pardee Center Task Force Report. Boston University, Boston.

Rosenbaum, P. R. and D. B. Rubin (1983). "The Central Role of the Propensity Score in Observational Studies for Causal Effects". *Biometrika* 70 (1): 41–55. doi:10.1093/biomet/70.1.41

Rosenzweig, M. R. and O. Stark (1989) Consumption Smoothing, Migration, and Marriage: Evidence from Rural India, *Journal of Political Economy*, University of Chicago Press, vol. 97(4), pages 905-26, August.

Ross, M. (2002) 'How Does Natural Resource Wealth Influence Civil War?' Mimeo.

Sanchez-Paramo, C., P. V. Dutta, Y. Ghorpade (2010) *South Asia - Regional Study on Targeting Systems and Practices: Draft Policy Note*. Washington, DC: World Bank. Available at: http://documents.worldbank.org/curated/en/2010/06/16441140/south-asia-regional-study-targeting-systems-practices-draft-policy-note Accessed on 09 October 2014

Satyanarayana, A. (2001) '*"Birds of Passage": Migration of South Indian Labour Communities to South-east Asia; 19th–20th Centuries, A.D.*', Clara Working Paper No. 11, Amsterdam. http://www.iisg.nl/clara/publicat/clara11.pdf.

Savage, K. and P. Harvey (2007) *"Remittances during Crises: Implications for Humanitarian Response"* Humanitarian Policy Group Report, available at: http://www.odi.org.uk/resources/hpg-publications/policy-briefs/26-remittances-criseshumanitarian-response.pdf.

Schmeidler, D. (1989) Subjective probability and expected utility without additivity, *Econometrica* Vol. 57, pp. 571 – 587.

Schutte, S. (2004) *"Urban Vulnerability in Afghanistan: Case Studies from Three Cities."* Working Paper Series, UNHCR, Afghanistan Research and Evaluation Unit, May 2004.

Seddon, D. (2005) *'Nepal's Dependence on Exporting Labor'*, Migration Information Source, http://www.migrationinformation. org/Profiles/display.cfm?id=277.

Semple, M. (2011) *Breach of Trust: People's experiences of the Pakistan Floods and their aftermath, June 2010 – July 2011.* Islamabad: Pattan Development Organization.

Sen, A. (1981) *Poverty and Famines*. Oxford: Clarendon Press.

Shapiro, J. and S. Gulzar (2012) *Political Violence in Pakistan: Myth vs. Realities*. Policy Brief. London: International Growth Centre.

Shapiro, J., C.C. Fair and R.B. Rais (2012) *Political Violence in Pakistan 1988-2010: Patterns and Trends*. Policy Brief. London: International Growth Centre.

Siddiqa, A. (2007). *Military Inc: Inside Pakistan's Military Economy*. Pakistan: Pluto Press.

Siegel, M., C.S. Ross, and C. King (2014) Examining the relationship between the prevalence of guns and homicide rates in the USA using a new and improved state-level gun ownership proxy. *Injury Prevention*. doi:10.1136/injuryprev-2014-041187

Small Arms Survey (2003) Obstructing Development: The Effects of Small Arms on Human Development. In *Small Arms Survey 2003: Development Denied*. Oxford: Oxford University Press.

Small Arms Survey (2001) *Small Arms Survey 2001: Profiling the Problem*. Oxford: Oxford University Press.

Small Arms Survey (2002) *Small Arms Survey 2002: Counting the Human Cost*. Oxford: Oxford University Press.

Solow, R. (1956), 'A Contribution to the Theory of Economic Growth', *Quarterly Journal of Economics*, 70(1), 65–94.

Solow, R. (1957), 'Technical Change and the Aggregate Production Function', *Review of Economics and Statistics*, 39, 312–20.

Spatafora, N. (2005) Workers' Remittances and Economic Development, (Chapter II) in *World Economic Outlook: Globalization and External Imbalances*, IMF, Washington, DC, pp. 69-84.

Stark, O., and D. Bloom (1985) The New Economics of Labour Migration. *American Economic Review*, 75, 173-178.

Stecklov, G., P. Winters, M. Stampini, and B. Davis (2005) Do conditional cash transfers influence migration? A study using experimental data from the Mexican PROGRESA program. *Demography*, 42(4), pp.769-90.

Stewart, F. and V. Fitzgerald (2001) *War and Underdevelopment: The Economic and Social Consequences of Conflict*. Oxford: Oxford University Press.

Stock, J. H. and M. Yogo (2005), "Testing for Weak Instruments in Linear IV Regression." Ch. 5 in J.H. Stock and D.W.K. Andrews (eds), *Identification and Inference for Econometric Models: Essays in Honor of Thomas J. Rothenberg*, Cambridge University Press.

Thompson, J. (2014) A Small Measure of Progress. The South Asia Channel. *Foreign Policy*. 22 December 2014. Accessed at http://foreignpolicy.com/2014/12/22/a-small-measure-of-progress/ on 23 June, 2015.

UNHCR (2011) *The WATAN Scheme for Flood Relief: Protection Highlights 2010 - 2011*. Islamabad: United Nations High Commission for Refugees.

UNOCHA (2012) PAKISTAN: Rivers. Dataset posted on 30 January 2012 (updated 30 April 2014) UN Office for the Coordination of Humanitarian Affairs. Accessed at:

http://pakresponse.info/LinkClick.aspx?fileticket=uXbylfZvdCg%3d&tabid=102&mid=601 on 02 August 2014.

Wald, N. and Bozzoli, C. (2011) Bullet Proof? Programme Evaluation in Conflict Areas: Evidence from Rural Colombia, Proceedings of the German Development Economics Conference, Berlin 2011, No. 80.

Waseem, M. (2002) "Causes of Democratic Downslide." *Economic and Political Weekly* 37, no. 44-45: 32-38.

WHO (World Health Organisation). 2002. *World Report on Violence and Health*. Geneva: WHO.

Williams, N. E., D. J. Ghimire, W. G. Axinn, E. A. Jennings and M. S. Pradhan (2012) A Micro-Level Event-Centered Approach to Investigating Armed Conflict and Population Responses. *Demography*. November 2012, Volume 49, Issue 4, pp 1521-1546.

Wooldridge, J. (2002) *Econometric Analysis of Cross Section and Panel Data.* Cambridge: MIT Press.

World Bank (2001) *World Development Report*. New York: Oxford University Press.

World Bank (2002) *World Development Report*. New York: Oxford University Press.

World Bank (2005) *Grenada: A Nation Rebuilding: An Assessment of Reconstruction and Economic Recovery One Year after Hurricane Ivan*, Available at: http://siteresources.worldbank.org/INTDISMGMT/Resources/grenanda_rebuilding.pdf

World Bank (2006) *Global Economic Prospects 2006: Economic Implications of Migration and Remittances*. The World Bank, Washington, D.C.

World Bank (2007) Pakistan - Social protection in Pakistan: Managing household risks and vulnerability. Washington, DC: World Bank. Available at: http://documents.worldbank.org/curated/en/2007/10/8900145/pakistan-social-protection-pakistan-managing-household-risks-vulnerability Accessed on 09 October 2014.

World Bank (2014) *Country Partnership Strategy for the Islamic Republic of Pakistan for the Period FY2015 – 19.* Report No. 84645-PK. Washington, D.C.: The World Bank. Accessed online at http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/04/15/000442464_20140415102619/Rendered/PDF/846450CAS0P146090Box385177B00OUO090.pdf on 15 September, 2015.

World Bank (2015a) Migration and Remittances: Recent Developments and Outlook Special Topic: Financing for Development. *Migration and Development Brief* 24 (April 2015). Migration and Remittances Team, Development Prospects Group, The World Bank. Washington, D.C. Accessed on 22 April, 2015 at: http://siteresources.worldbank.org/INTPROSPECTS/Resources/334934-1288990760745/MigrationandDevelopmentBrief24.pdf

World Bank (2015b) Annual Remittances Data – Inflows. Accessed on 22 April, 2015 at http://siteresources.worldbank.org/INTPROSPECTS/Resources/334934-1288990760745/RemittanceData_Inflows_Apr2015.xls

Yang, D. (2005) *Coping With Disaster: The Impact of Hurricanes on International Financial Flows, 1970–2001.* Ann Arbor, MI: Gerald R. Ford School of Public Policy and Department of Economics, University of Michigan.

Yang, D. and H. Choi (2005) *Are Remittances Insurance? Evidence from Rainfall Shocks in the Philippines.* Washington DC: World Bank Research Program on International Migration and Development.

Yusuf, M. (2014) *Pakistan's Counterterrorism Challenge*. United States Institute of Peace. Washington, D.C.: Georgetown University Press.

Zaman, M. Q. (1998) Sectarianism in Pakistan: The Radicalization of Shi'i and Sunni Identities. *Modern Asian Studies* **32,** 3 (1998), pp. 689: 716

Appendices

Appendix 1. Household Survey Dataset Access

Citizen's Damage Compensation Programme Baseline Evaluation Household Survey Dataset

Oxford Policy Management Ltd., Oxford, UK and Islamabad, Pakistan

Oxford Policy Management

21.07.2015

To
Mr. Yashodhan Ghorpade
Marie-Curie ITN Doctoral Student Researcher [Economics]
Institute of Development Studies DPhil Centre
University of Sussex, Library Road,
Falmer Brighton BN1 9RE, UK

Dear Mr. Ghorpade
SUBJECT: Access to Citizen's Damage Compensation Programme Baseline and End line Household Survey Datasets

In response to your request for access to the Citizen's Damage Compensation Programme (CDCP) Baseline and End line Household Survey Datasets for your PhD thesis titled "Essays on Household Behaviour and Economic Decisions in the Aftermath of the 2010 Floods in Pakistan", I am pleased to confirm that we are happy to grant you access to the survey datasets for use in accordance with normal academic practice.

OPM have provided you the following data electronically:

1. CDCP Baseline Household Survey Dataset – Comprising Male, Female and Community Questionnaires (2011-12)
2. CDCP End line Household Survey Dataset (2013) – Comprising Male, Female and Community Questionnaires
3. CDCP Baseline Survey Qualitative Interview Transcripts
4. CDCP End line Survey Qualitative Interview Transcripts

We hope this will help you in your academic research and wish you all the best for your PhD studies.

Regards

Simon Hunt

Managing Director

Oxford Policy Management Ltd.
6 St Aldates Courtyard
38 St Aldates
Oxford
OX1 1BN
United Kingdom

Company Registered in England No. 3122495

Tel. +44 (0) 1865 207300
Fax. +44 (0) 1865 207301
Website:www.opml.co.uk

Appendix 2. Summary Statistics – by Chapter

Appendix 2.3a: Chapter 3. Summary Statistics – Household Level Variables

	Units	Mean	Standard Deviation	Minimum	Maximum	N
Dependent Variables						
Received CDCP - I	Dummy (1 = yes)	0.613	0.487	0	1	7802
Received BISP	Dummy (1 = yes)	0.154	0.361	0	1	7802
Independent variable						
Log (1+n) killings at tehsil level	(Log killings)	1.104	1.762	0	6.480	7802
Instruments						
Nearest Distance to Afghanistan-Pakistan Border	Degrees	2.272	1.166	0.403	5.925	7802
Controls						
HH size	count	6.515	3.177	1	48	7802
Urban	dummy	0.094	0.292	0	1	7802
No. males with primary Education	count	1.261	1.414	0	13	7802
No. females with primary Education	count	0.572	1.019	0	12	7802
No. of family members above 14	count	3.582	1.960	1	29	7802
Value of Livestock (pre-flood)	PKR	81297	125600.5	0	700000	7799
Age of HH Head	years	44.566	14.367	15	98	7802
Total No. of Male members in HH	count	3.308	1.925	0	24	7802
Female Headed HH	dummy	0.093	0.291	0	1	7802
Landless HH	dummy	0.670	0.470	0	1	7802

Rentier Land Lord HH	dummy	0.047	0.211	0	1	7802
Farmland Owned	Acres	1.7	7.87	0	200	7785
HH owns non-agricultural enterprise	dummy	0.185	0.388	0	1	7802
HH has access to drainage	dummy	0.283	0.450	0	1	7802
Flood Exposure Index	Continuous	2.204	0.932	0	3.42	7802
Punjab	dummy	0.298	0.457	0	1	7802
Sindh	dummy	0.280	0.449	0	1	7802
Balochistan	dummy	0.196	0.397	0	1	7802
KPK	dummy	0.226	0.418	0	1	7802
Distance to District Capital	degrees	0.452	0.281	0.01	1.94	7802
Distance to Province Capital	degrees	2.396	1.313	0.01	5.91	7802
Index of Linguistic Fractionalisation	Continuous [0,1]	0.217	0.230	0	0.74	7802
Community Infrastructure Index	Count	5.593	2.245	0	12	7786
Community state presence index	Count	4.890	4.453	0	32	7786
Distance to nearest Army Cantonment	degrees	0.642	0.354	0.01	1.36	7802
Inland Plain	dummy	0.864	0.343	0	1	7786
Coastal Plain	dummy	0.035	0.184	0	1	7786
Plateau	dummy	0.009	0.096	0	1	7786
Hills	dummy	0.023	0.151	0	1	7786

Valley	dummy	0.015	0.122	0	1	7786
Mountain	dummy	0.037	0.189	0	1	7786
Desert	dummy	0.008	0.090	0	1	7786
HH Bank Account	dummy	0.108	0.310	0	1	7802

Appendix 2.3b. Summary Statistics - Conflict and Cash Transfers: Community Level Analysis

	Units	Mean	Standard Deviation	Minimum	Maximum	N
Dependent vars.						
Community excluded from CDCP - I	Dummy (1= yes)	0.048	0.214	0	1	498
Coverage Rate of CDCP – I	Continuous [0,1]	0.609	0.272	0	1	498
Community excluded from BISP	Dummy (1= yes)	0.259	0.438	0	1	498
Coverage Rate of BISP	Continuous [0,1]	0.153	0.151	0	0.688	498
Independent Vars.						
Log (1+n) killings at tehsil level	(Log killings)	1.110	1.763	0	6.480	498
Instruments						
Nearest Distance to Afghanistan-Pakistan Border	Degrees	2.260	1.172	0.403	5.925	498
Controls						
Share of HHs displaced in Flooding	Continuous [0,1]	0.763	0.309	0	1	498
Flood Exposure Index	continuous	2.184	0.946	0	3.424	498
Urban	dummy	0.092	0.290	0	1	498
Share of female-headed HHs	Continuous [0,1]	0.094	0.098	0	0.600	498
Share of Landless HHs in community	Continuous [0,1]	0.668	0.244	0	1	498
Share of Rentier landlord HHs	Continuous [0,1]	0.048	0.075	0	0.538	498
Distance to District Capital	degrees	0.333	0.472	0	1	499
Distance to Province Capital	degrees	0.449	0.281	0.013	1.944	498
Index of Linguistic Fractionalisation	Continuous [0,1]	2.385	1.313	0.011	5.915	498
Community Infrastructure Index	Count	0.218	0.231	0	0.742	498
Community state presence index	Count	5.611	2.256	0	12	498

Distance to nearest Army Cantonment	degrees	4.932	4.527	0	32	498
Inland Plain	dummy	0.640	0.355	0.008	1.362	498
Coastal Plain	dummy	0.859	0.348	0	1	498
Plateau	dummy	0.034	0.182	0	1	498
Hills	dummy	0.010	0.100	0	1	498
Valley	dummy	0.026	0.160	0	1	498
Mountain	dummy	0.016	0.126	0	1	498
Desert	dummy	0.038	0.192	0	1	498
Punjab	dummy	0.008	0.089	0	1	498
Sindh	dummy	0.295	0.457	0	1	498
Balochistan	dummy	0.277	0.448	0	1	498
KPK	dummy	0.199	0.399	0	1	498
At-risk district	dummy	0.229	0.421	0	1	498

Appendix 2.4 Conflict and Remittances

	Units	Mean	Standard Deviation	Minimum	Maximum	N
Dependent Variables						
Received Any Remittance	Dummy (1 = yes)	0.119	0.324	0	1	7802
Value of Remittances Received	PKR	4951	24279	0	720000	7797
Independent variable						7802
Log (1+n) killings at tehsil level	(Log killings)	1.104	1.762	0	6.480	7802
Instruments						7802
Nearest Distance to Afghanistan-Pakistan Border	Degrees	2.272	1.166	0.403	5.925	7802
Controls						7802
HH size	count	6.515	3.177	1	48	7802
Urban	dummy	0.094	0.292	0	1	7802
No. males with primary Education	count	1.261	1.414	0	13	7802
No. females with primary Education	count	0.572	1.019	0	12	7802
No. of family members above 14	count	3.582	1.960	1	29	7802
Value of Livestock (pre-flood)	PKR	81297	125600.5	0	700000	7799
Age of HH Head	years	44.566	14.367	15	98	7802
Total No. of Male members in HH	count	3.308	1.925	0	24	7802

Female Headed HH	dummy	0.093	0.291	0	1	7802
Landless HH	dummy	0.670	0.470	0	1	7802
Rentier Land Lord HH	dummy	0.047	0.211	0	1	7802
Farmland Owned	Acres	1.7	7.87	0	200	7785
HH owns non-agricultural enterprise	dummy	0.185	0.388	0	1	7802
HH has access to drainage	dummy	0.283	0.450	0	1	7802
Flood Exposure Index	Continuous	2.204	0.932	0	3.42	7802
Flooding Anomaly Index	Continuous [,]	0.000	1.379	-5.21	5.34	7802
Social Capital Measure	count	1.693	3.653	0	25	7802
HH received CDCP – I transfer	dummy	0.613	0.487	0	1	7802
HH received BISP transfer	dummy	0.154	0.361	0	1	7802
Punjab	dummy	0.298	0.457	0	1	7802
Sindh	dummy	0.280	0.449	0	1	7802
Balochistan	dummy	0.196	0.397	0	1	7802
KPK	dummy	0.226	0.418	0	1	7802
Distance to District Capital	degrees	0.452	0.281	0.01	1.94	7802
Distance to Province Capital	degrees	2.396	1.313	0.01	5.91	7802
Index of Linguistic Fractionalisation	Continuous [0,1]	0.217	0.230	0	0.74	7802

Community Infrastructure Index	Count	5.593	2.245	0	12	7786
Community state presence index	Count	4.890	4.453	0	32	7786
Distance to nearest Army Cantonment	degrees	0.642	0.354	0.01	1.36	7802
Inland Plain	dummy	0.864	0.343	0	1	7786
Coastal Plain	dummy	0.035	0.184	0	1	7786
Plateau	dummy	0.009	0.096	0	1	7786
Hills	dummy	0.023	0.151	0	1	7786
Valley	dummy	0.015	0.122	0	1	7786
Mountain	dummy	0.037	0.189	0	1	7786
Desert	dummy	0.008	0.090	0	1	7786
HH Bank Account	dummy	0.108	0.310	0	1	7802

Appendix 2.5 Aid and Gun Acquisition

	Units	Mean	Standard Deviation	Minimum	Maximum	N
Dependent Variables						
HH Owns a gun	Dummy (1 = Yes)	0.109	0.312	0	1	7113
No response	dummy	0.088	0.284	0	1	7802
HH Acquired a gun after 2010 floods	dummy	0.013	0.112	0	1	7802
Treatment Variable						
HH received CDCP – I	dummy	0.61	0.49	0	1	7802
Independent Variables						
HH size	count	6.515	3.177	1	48	7802
Urban	dummy	0.094	0.292	0	1	7802
No. males with primary Education	count	1.261	1.414	0	13	7802
No. females with primary Education	count	0.572	1.019	0	12	7802
No. of family members above 14	count	3.582	1.960	1	29	7802
Value of Livestock (pre-flood)	PKR	81297	125601	0	700000	7799
Age of HH Head	years	44.6	14.4	15	98	7802
Total No. of Male members in HH	count	3.308	1.925	0	24	7802
Female Headed HH	dummy	0.093	0.291	0	1	7802
Landless HH	dummy	0.670	0.470	0	1	7802

Land ownership > 0 & ≤ 1.5 acres	dummy	0.063	0.242	0	1	7802
Land ownership > 1.5 & ≤ 12.5 acres	dummy	0.168	0.374	0	1	7802
Land ownership 12.5 acres	dummy	0.027	0.161	0	1	7802
HH owns non-agricultural enterprise	dummy	0.185	0.388	0	1	7802
HH has access to drainage	dummy	0.283	0.450	0	1	7802
Received Any Remittance	dummy	0.119	0.324	0	1	7802
Duration of displacement due to floods	days	51.901	55.511	0	365	7695
Distance to District Capital	degrees	0.452	0.281	0.013	1.944	7802
Distance to Province Capital	degrees	2.396	1.313	0.011	5.915	7802
Index of Linguistic Fractionalisation	Continuous [0,1]	0.217	0.230	0	0.742	7802
Community Infrastructure Index	Count	5.593	2.245	0	12	7786
Community state presence index	Count	4.890	4.453	0	32	7786
Distance to nearest Army Cantonment	degrees	0.642	0.354	0.008	1.362	7802
Inland Plain	dummy	0.864	0.343	0	1	7786
Coastal Plain	dummy	0.035	0.184	0	1	7786
Plateau	dummy	0.009	0.096	0	1	7786
Hills	dummy	0.023	0.151	0	1	7786
Valley	dummy	0.015	0.122	0	1	7786
Mountain	dummy	0.037	0.189	0	1	7786

Desert	dummy	0.008	0.090	0	1	7786
Former princely state (dummy)	dummy	0.056	0.230	0	1	7802
Nation Building District – At risk of radicalisation	dummy	0.337	0.473	0	1	7802
Urdu	dummy	0.068	0.252	0	1	7802
Sindhi	dummy	0.348	0.476	0	1	7802
Pushto	dummy	0.190	0.393	0	1	7802
Balochi	dummy	0.040	0.196	0	1	7802
Hindko	dummy	0.014	0.117	0	1	7802
Saraiki	dummy	0.216	0.411	0	1	7802
Brahvi	dummy	0.019	0.137	0	1	7802
Other Language	dummy	0.008	0.088	0	1	7802
Distance to Afghanistan-Pakistan border	degrees	2.272	1.166	0.403	5.925	7802
Conflict-affected Tehsil	dummy	0.393	0.488	0	1	7802
KPK	dummy	0.226	0.418	0	1	7802
Sindh	dummy	0.280	0.449	0	1	7802
Balochistan	dummy	0.196	0.397	0	1	7802
N		7802				

Appendix 2.6a Floods and Migration: Household-level variables: Summary Statistics

	Units	Mean	Std. Dev.	Min.	Max.	N
Dependent variables						
Anyone in HH migrated since 2010 floods	dummy	0.59	0.49	0	1	7802
Any HH migrant since 2010 floods returned home	dummy	0.57	0.49	0	1	7802
Any HH migrant since 2010 floods still away from home	dummy	0.03	0.18	0	1	7802
Controls						
Household size	count	6.51	3.18	1	48	7802
Urban	dummy	0.09	0.29	0	1	7802
No. males with primary Education	count	1.26	1.41	0	13	7802
No. females with primary Education	count	0.57	1.02	0	12	7802
No. males with secondary Education	count	0.65	1.01	0	8	7802
No. females with secondary Education	count	0.19	0.58	0	7	7802
No. of family members above 14	count	3.58	1.96	1	29	7802
Value of Livestock (pre-flood)	PKR	81,297	125,601	0	700,000	7799
No. of rooms in the house	count	1.60	1.18	0	9	7802
Age of HH Head	years	44.57	14.37	15	98	7802
Total No. of Male members in HH	count	3.31	1.93	0	24	7802
Female Headed HH	dummy	0.09	0.29	0	1	7802

Landless HH	dummy	0.67	0.47	0	1	7802
Rentier Land Lord HH	dummy	0.05	0.21	0	1	7802
HH owns non-agricultural enterprise	dummy	0.19	0.39	0	1	7802
Farmland owned	Acres	1.67	7.87	0	200	7785
HH still displaced by flood	dummy	0.01	0.12	0	1	7802
Social Capital Measure	count	1.80	4.85	0	130	7802
HH received CDCP – I	dummy	0.61	0.49	0	1	7802
HH received BISP	dummy	0.15	0.36	0	1	7802

Appendix 2.6b Floods and Migration: Individual-level Variables: Summary Statistics

	Units	Mean	Std. Dev.	Min.	Max.	N
Dependent variables						
Individual migrated after 2010 floods	dummy	0.539	0.499	0	1	30697
Migrant back home after migrating since 2010 floods	dummy	0.983	0.129	0	1	16539
Migrant still away from HH after migrating since 2010 floods	dummy	0.017	0.129	0	1	16539
Migration Destination = Urban	dummy	0.296	0.456	0	1	16539
Migration Destination: within district	dummy	0.526	0.499	0	1	16539
Migration Destination: within province, outside district	dummy	0.365	0.481	0	1	16539
Migration Destination: within Pakistan, outside	dummy	0.106	0.307	0	1	16539

province						
Migration Destination: abroad	dummy	0.002	0.042	0	1	16539
Controls						
Age	Years	33.1	16.7	13	96	30697
Male	dummy	0.498	0.500	0	1	30697
Highest level of education completed: Primary	dummy	0.138	0.345	0	1	30697
Highest level of education completed: Secondary	dummy	0.160	0.366	0	1	30697
Highest level of education completed: Tertiary/ Graduate	dummy	0.049	0.216	0	1	30697
Highest level of education completed: Postgraduate	dummy	0.007	0.082	0	1	30697

Appendix 2.6c Floods and Migration: Community-level variables – I: Summary Statistics

	Units	Mean	Std. Dev.	Min.	Max.	N
Explanatory Variables						
Flood Exposure Index	continuous	2.184	0.946	0	3.424	498
Flooding Anomaly Index	continuous	0.001	1.384	-5.211	5.335	498
Controls						
Prop. Adult males with primary Education in community	continuous [0,1]	0.077	0.083	0	0.5	499
Prop. Adult females with primary Education in community	continuous [0,1]	0.149	0.114	0	0.710	498

Prop. Adult males with secondary Education in community	continuous [0,1]	0.066	0.095	0	0.429	499
Prop. Adult females with secondary Education in community	continuous [0,1]	0.295	0.195	0	0.944	498
Share of HHs with electricity	continuous [0,1]	0.798	0.297	0	1	498
Share of HHs with drainage	continuous [0,1]	0.284	0.329	0	1	498
Share of female-headed HHs in community	continuous [0,1]	0.094	0.098	0	0.60	498
Avg. no of rooms per HH in community	count	1.604	0.444	0.875	4.25	498
Share of non-Agricultural Enterprise owning HHs in community	continuous [0,1]	0.184	0.188	0	1	498
Share of Landless HH in community	continuous [0,1]	0.668	0.244	0	1	498
Share of Rentier landlord HH in community	continuous [0,1]	0.048	0.075	0	0.538	498
Share of own-land cultivating HHs in community	continuous [0,1]	0.284	0.235	0	1	498
Share of Adult Males in community	continuous [0,1]	0.503	0.047	0.294	0.614	498
Average no. of social connections per HH outside community	count	1.829	2.045	0	16.438	498
Index of Linguistic Fractionalisation	continuous [0,1]	0.218	0.231	0	0.742	498
Community state presence index	count	2.054	1.309	0	6	497
Community Infrastructure Index	count	5.608	2.257	0	12	497
Distance to Province Capital	degrees	2.385	1.313	0.011	5.915	498
Distance to District Capital	degrees	0.449	0.281	0.013	1.944	498
Inland Plain	dummy	0.859	0.348	0	1	497
Coastal Plain	dummy	0.034	0.182	0	1	497

Plateau	dummy	0.010	0.100	0	1	497
Hills	dummy	0.026	0.160	0	1	497
Valley	dummy	0.016	0.126	0	1	497
Mountain	dummy	0.038	0.192	0	1	497
Desert	dummy	0.008	0.089	0	1	497

Appendix 2.6d Floods and Migration: Community-level averages of HH-level variables: Summary Statistics

	Units	Mean	Std. Dev.	Min.	Max.	N
Share of HHs with any Outstanding debt	continuous [0,1]	0.814	0.142	0	1	498
Share of HHs with Outstanding debt to bank/ formal financial institution	continuous [0,1]	0.047	0.073	0	0.4	498
Share of HHs with Outstanding debt to employer	continuous [0,1]	0.041	0.091	0	0.688	498
Share of HHs with Outstanding debt to micro-lender	continuous [0,1]	0.020	0.049	0	0.313	498
Outstanding debt to money-lender	continuous [0,1]	0.066	0.113	0	0.938	498
Share of HHs with Outstanding debt to family/ friend	continuous [0,1]	0.463	0.231	0	1	498
Share of HHs with Outstanding debt to shop (goods on credit)	continuous [0,1]	0.445	0.200	0	0.938	498
Share of HHs with Outstanding debt to other lender	continuous [0,1]	0.036	0.075	0	0.5	498

Average Total Debt (PKR)	PKR	49,893	28,595	0	173,867	499
Average value of Formal Savings	PKR	848	3,085	0	33,713	499
Informal Savings (PKR)	PKR	14,867	18,029	0	133,333	498
Combined Savings (PKR)	PKR	15,407	18,902	0	141,571	498
Share of HHs Receiving any remittance	continuous [0,1]	0.1189	0.1218	0	0.6875	498
Avg. Remittance Amount per HH (PKR)	PKR	4,636	7,924	0	69,375	498

Appendix 3.1. IV Estimates of effect of Conflict on Access to Aid: Distance from nearest official border crossing as IV for conflict [log (1+n) killings at sub-district level]

Table A3.1.1 Conflict instrumented by Distance to the nearest official border crossing on Afghan-Pakistan Border: IV First-Stage Results

	Households as unit^		
	(4)	(5)	(6)
Distance to nearest official border crossing on Af-Pak border	-0.671***	-0.272***	-0.191***
	(-63.85)	(-14.28)	(-9.97)
Province dummies	no	yes	yes
Controls	no	no	yes
N	7802	7802	7767
Partial F-statistic	184.27	25.59	9.56
Prob. > F	0.0000	0.0000	0.0021
Adjusted R-squared	0.3432	0.4708	0.5647

^Standard errors clustered at community level

Table A3.1.2 Access to Aid: IV Probit Estimates – Marginal Effects

	CDCP - I	BISP
Log (1+n) killings	-0.530***	-0.562***
	(-3.12)	(-4.28)
Controls	Y	Y
Province Dummies	Y	Y
N	7767	7767

Marginal effects; t statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* p < 0.10, ** p < 0.05, *** p < 0.01

Table A3.1.3 Access to Aid: Princely States Mechanism (IV Estimates) – Marginal Effects

	CDCP		BISP	
	(1)	(2)	(3)	(4)
Log (1+n) killings	-0.530***	-0.320*	-0.562***	-0.501***
	(-3.12)	(-1.68)	(-4.28)	(-3.73)
Princely states dummy		-1.097***		-0.392**
		(-4.62)		(-2.31)
N	7767	7767	7767	7767

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01

Table A3.1.4 CDCP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV Estimates) – Marginal Effects

	Full Sample	Residuals of Female Primary Enrollment Estimation		Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present	Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.530***	-0.064	-0.175	-0.200	-0.074
	(-3.12)	(-0.30)	(-0.06)	(-0.98)	(-0.22)
N	7767	3313	3552	3576	3289

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01

Table A3.1.5 BISP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV Estimates) – Marginal Effects

	Full Sample	Residuals of Female Primary Enrollment Estimation		Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present	Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.562***	-0.421***	-0.790***	-0.347**	-0.192
	(-4.28)	(-3.02)	(-4.79)	(-2.49)	(-0.68)
N	7767	3313	3552	3576	3289

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01

Table A3.1.6 CDCP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV Estimates) – Marginal Effects: Excluding Balochistan

	Full Sample	Residuals of Female Primary Enrollment Estimation		Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present	Taliban likely not present	Taliban likely present
Log (1+n) killings	0.195	0.297**	-0.240	0.172	0.266
	(1.53)	(2.02)	(-0.81)	(1.15)	(0.71)
N	6246	2741	2872	2974	2639

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01

Table A3.1.7 BISP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV Estimates) – Marginal Effects: Excluding Balochistan

	Full Sample	Residuals of Female Primary Enrollment Estimation		Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present	Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.258**	-0.181	-0.499**	-0.096	-0.617**
	(-2.35)	(-1.60)	(-2.00)	(-0.89)	(-2.51)
N	6246	2741	2872	2974	2639

Marginal effects; t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.1.8 IV probit estimates of the total absence of CDCP – I and BISP in the community– Marginal Effects

	CDCP - I	BISP
Log (1+n) killings	0.210*	0.702***
	(1.92)	(5.93)
N	497	497

Marginal effects; t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.1.9 IV Tobit estimates of the community-level rates of coverage: CDCP – I and BISP – Marginal Effects

	CDCP - I	BISP
Log (1+n) killings	-0.287**	-0.213**
	(-2.04)	(-2.30)
N	497	497

Marginal effects; *t* statistics in parentheses
Dependent variable censored between 0 and 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 3.2. IV Estimates of effect of Conflict on Access to Aid: Proportion of Pashtu speakers at community level as IV for conflict [log (1+n) killings at sub-district level]

Table A3.2.1 Conflict instrumented by proportion of Pashtu speakers: IV First-Stage Results

	(1)	(2)	(3)
Proportion of Pashtu speakers	3.26***	2.29***	1.74***
	(89.27)	(38.56)	(24.08)
Province dummies	no	yes	yes
Controls	no	no	yes
N	7802	7802	7767
Partial F-statistic	264.97	39.30	20.16
Prob. > F	0.0000	0.0000	0.0000
Adjusted R-squared	0.5053	0.5439	0.5899

^Standard errors clustered at community level
* p < 0.10, ** p < 0.05, *** p < 0.01

Table A3.2.2 Access to Aid: IV Probit Estimates – Marginal Effects

	CDCP - I	BISP
Log (1+n) killings	-0.222**	-0.170**
	(-2.26)	(-2.10)
Controls	Y	Y
Province Dummies	Y	Y
N	7767	7767

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01

Table A3.2.3 Access to Aid: Princely States Mechanism (IV Estimates) – Marginal Effects

	CDCP		BISP	
	(1)	(2)	(3)	(4)
Log (1+n) killings	-0.222**	-0.216**	-0.170**	-0.168**
	(-2.26)	(-2.14)	(-2.10)	(-2.10)
Princely states dummy		-1.104***		-0.370***
		(-5.19)		(-2.66)
N	7767	7767	7767	7767

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01

Table A3.2.4 CDCP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV Estimates) – Marginal Effects

	Full Sample	Residuals of Female Primary Enrollment Estimation		Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present	Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.222**	-0.037	-0.256*	-0.077	-0.304*
	(-2.26)	(-0.30)	(-1.92)	(-0.64)	(-1.92)
N	7767	3313	3552	3576	3289

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01

Table A3.2.5 CDCP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV Estimates) – Marginal Effects: Excluding Balochistan

	Full Sample	Residuals of Female Primary Enrollment Estimation		Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present	Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.090	0.053	-0.200*	0.058	-0.320**
	(-1.26)	(0.54)	(-1.92)	(0.66)	(-2.41)
N	6246	2741	2872	2974	2639

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01

Table A3.2.6 BISP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV Estimates) – Marginal Effects

	Full Sample	Residuals of Female Primary Enrollment Estimation		Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present	Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.170**	-0.181*	-0.127	-0.249***	-0.027
	(-2.10)	(-1.85)	(-1.13)	(-2.62)	(-0.20)
N	7767	3313	3552	3576	3289

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01

Table A3.2.7 BISP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV Estimates) – Marginal Effects: Excluding Balochistan

	Full Sample	Residuals of Female Primary Enrollment Estimation		Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present	Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.170**	-0.181*	-0.127	-0.122*	-0.051
	(-2.10)	(-1.85)	(-1.13)	(-1.70)	(-0.48)
N	7767	3313	3552	2974	2639

Marginal effects; t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.2.8 IV probit estimates of the total absence of CDCP – I and BISP in the community – Marginal Effects

	CDCP - I	BISP
Log (1+n) killings	0.110***	0.250
	(2.95)	(1.18)
N	497	497

Marginal effects; t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.2.9 IV Tobit estimates of the community-level rates of coverage: CDCP – I and BISP – Marginal Effects

	CDCP - I	BISP
Log (1+n) killings	-0.091**	-0.054**
	(-2.25)	(-1.98)
N	497	497

Marginal effects; *t* statistics in parentheses
Dependent variable censored between 0 and 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 3.3. IV Estimates of effect of Conflict on Access to Aid: Nearest distance to Afghanistan-Pakistan border as IV for conflict [dummy for conflict-affected sub-district - tehsil]

Table A3.3.1 Conflict-affected sub-district instrumented by nearest distance to Afghanistan-Pakistan border: IV First-Stage Results

	(1)	(2)	(3)
Conflict-affected tehsil (dummy)	-0.219***	-0.101***	-0.053***
	(-54.27)	(-14.41)	(-7.53)
Province dummies	no	yes	yes
Controls	no	no	yes
N	7802	7802	7767
Partial F-statistic	315.38	20.12	4.87
Prob. > F	0.0000	0.0000	0.0278
Adjusted R-squared	0.2740	0.3112	0.4355

^Standard errors clustered at community level

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.3.2 Access to Aid: IV Probit Estimates – Marginal Effects

	CDCP - I	BISP
Conflict-affected tehsil (dummy)	-1.952***	-1.916***
	(-3.72)	(-3.53)
Controls	Y	Y
Province Dummies	Y	Y
N	7767	7767

Marginal effects; t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.3.3 Access to Aid: Princely States Mechanism (IV Estimates) – Marginal Effects

	CDCP		BISP	
	(1)	(2)	(3)	(4)
Conflict-affected tehsil (dummy)	-1.952***	-1.196*	-1.916***	-1.491***
	(-3.72)	(-1.93)	(-3.53)	(-2.98)
Princely states dummy		-1.232***		-0.632***
		(-4.27)		(-2.77)
N	7767	7767	7767	7767

Marginal effects; *t* statistics in parentheses

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.3.3 CDCP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV Estimates)

	Full Sample	Residuals of Female Primary Enrollment Estimation		Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present	Taliban likely not present	Taliban likely present
Conflict-affected tehsil (dummy)	-1.952***	-0.215	-2.371***	-0.953	-0.828
	(-3.72)	(-0.25)	(-5.56)	(-1.18)	(-0.49)
N	7767	3313	3552	3576	3289

Marginal effects; *t* statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.3.4 BISP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV Estimates)

	Full Sample	Residuals of Female Primary Enrollment Estimation		Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present	Taliban likely not present	Taliban likely present
Conflict-affected tehsil (dummy)	-1.916***	-1.383***	-2.172***	-1.224**	-2.443***
	(-3.53)	(-2.60)	(-2.99)	(-2.12)	(-3.76)
N	7767	3313	3552	3576	3289

Marginal effects; *t* statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.3.5 CDCP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV Estimates): Excluding Balochistan

	Full Sample	Residuals of Female Primary Enrollment Estimation		Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present	Taliban likely not present	Taliban likely present
Conflict-affected tehsil (dummy)	0.353	1.077**	-0.898	0.565	0.108
	(0.86)	(2.11)	(-1.62)	(1.00)	(0.15)
N	6246	2741	2872	2974	2639

Marginal effects; *t* statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.3.6 BISP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV Estimates): Excluding Balochistan

	Full Sample	Residuals of Female Primary Enrollment Estimation		Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present	Taliban likely not present	Taliban likely present
Conflict-affected tehsil (dummy)	-0.669**	-0.653	-0.893	-0.199	-1.219**
	(-2.00)	(-1.59)	(-1.57)	(-0.49)	(-2.03)
N	6246	2741	2872	2974	2639

Marginal effects; *t* statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.3.5 IV probit estimates of the total absence of CDCP – I and BISP in the community

	CDCP - I	BISP
Conflict-affected Tehsil (dummy)	0.944	2.457***
	(1.54)	(7.38)
N	497	497

Marginal effects; *t* statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.3.6 IV Tobit estimates of the community-level rates of coverage: CDCP – I and BISP

	CDCP - I	BISP
Conflict-affected Tehsil (dummy)	-1.272	-0.847*
	(-1.55)	(-1.75)
N	497	497

Marginal effects; *t* statistics in parentheses
Dependent variable censored between 0 and 1
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 3.4. Estimation of Community-level Female Primary School Enrolment and Primary Schooling Gender Gap (M – F) rates

	Community-level rate of female primary enrollment		Community-level gender gap in primary enrollment (M – F)	
	Coeff.	*t*	Coeff.	*t*
Urban	-0.139	-1.50	0.025	0.26
Prop: Adult Females with Primary Education	0.426*	1.93	-0.028	-0.12
Prop: Adult Males with Primary Education	0.142	0.79	0.143	0.74
Prop: Adult Females with Secondary Education	0.093	0.38	-0.401	-1.54
Prop: Adult Males with Secondary Education	0.319*	1.92	0.262	1.46
Average Monthly Per-Capita Adult-equivalent expenditure	0.000***	2.69	-0.000	-1.14
Prop: Households Still Displaced by flood	0.076	0.31	0.203	0.78
Prop: Punjabi	0.176	1.16	0.155	0.95
Prop: Sindhi	-0.006	-0.04	0.270*	1.74
Prop: Pushtu	0.037	0.27	0.148	0.97
Prop: Balochi	0.000	.	0.000	.
Prop: Urdu	0.158	1.03	0.049	0.30
Prop: Brahvi	-0.272	-1.48	0.355*	1.79
Prop: Hindko	0.132	0.56	0.062	0.24
Prop: Saraiki	0.186	1.29	0.040	0.26
Prop: Other Languages	-0.130	-0.35	0.048	0.12
Prop. Households receiving remittances	0.083	0.70	0.152	1.19
Prop. Households with electricity	0.190***	3.98	-0.025	-0.48
Prop: Female-headed Households	0.184	1.24	-0.340**	-2.13
Average no. of rooms per household	0.032	1.02	-0.030	-0.89
Prop: Households owning non-agricultural enterprise	0.118	1.49	0.079	0.93
Prop: landless Households	-0.030	-0.53	0.004	0.06
Prop: Landlord households (letting it out)	-0.062	-0.36	0.115	0.63
Average share of household members > 15 who have attended school	0.471	1.57	-0.455	-1.42
Average adult sex ratio of the household	-0.057	-0.20	-0.244	-0.79
Punjab	0.000	.	0.000	.
Sindh	0.004	0.04	-0.200**	-2.10
Balochistan	-0.140*	-1.82	0.023	0.28
Khyber- Pakhtunkhwa	-0.067	-0.76	-0.076	-0.80
Distance to province capital	-0.038**	-2.05	0.000	0.02
Distance to district capital	0.038	0.93	-0.088**	-1.99
Index of presence of state institutions	0.018	1.46	0.010	0.69
Index of Community infrastructure	-0.005	-0.58	0.003	0.33
Index of linguistic fractionalisation	-0.039	-0.49	0.057	0.66
Former princely states dummy	0.103	1.54	-0.060	-0.84
Govt. girls primary school present in community	0.008	0.26	0.037	1.10
Govt. co-ed primary school present	0.037	1.17	0.006	0.17

in community				
Pvt. girls primary school present in community	-0.000	-0.03	0.017	1.18
Pvt. co-ed primary school present in community	0.011**	2.17	0.002	0.46
Govt. boys primary school present in community			-0.059	-1.60
Pvt. boys primary school present in community			-0.025	-1.46
Constant	-0.205	-0.81	0.388	1.44
N	439		439	
R^2	0.519		0.124	
adj. R^2	0.475		0.039	
F	11.62		1.45	
Prob. F > 0	0.0000		0.0434	

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 3.5. Sub-samples based on residuals of the community-level gender gap in primary schooling

I also examine residuals from the estimation of the community-level gender gap in primary schooling (simply measured as the difference in the shares of primary school age boys and girls enrolled in school at the community level) to proxy the likelihood of non-state armed group control.

The underlying assumption is that after controlling for all plausible demand and supply-side factors that determine the gender-gap in primary schooling at the community level[86], the presence of Taliban-affiliate groups would increase the gender gap. As in the case with female primary enrolment above, I divide the sample into two sub-samples: (i) areas less likely to have the control of armed groups, with the residual $v_c \leq 0$ [87], and (ii) areas more likely to have armed non-state groups' control, with positive residuals, $v_c > 0$.

Table A3.5.1 CDCP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV estimates) based on Primary Schooling Gender Gap Residuals

	Full Sample	Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.512***	-0.262	-0.775***
	(-3.60)	(-1.21)	(-4.13)
N	7767	3576	3289

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.5.2 BISP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV Estimates) based on Primary Schooling Gender Gap Residuals

	Full Sample	Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.444***	-0.353**	-0.758***
	(-3.54)	(-2.46)	(-3.83)
N	7767	3576	3289

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

---

[86] Including adult female educational attainment that controls for attitudinal drivers of the gender bias in primary schooling

[87] As Taliban control/ presence would, ceteris paribus, increase the gender gap, in this case *positive* residuals indicate the presence of such groups. In the case of female primary enrolment rates, the presence of armed non state groups *reduced* the value of the dependant variable.

Table A3.5.3 CDCP - I Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV estimates) based on Primary Schooling Gender Gap Residuals: Excluding Balochistan

	Full Sample	Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely not present
Log (1+n) killings	0.110	0.169	0.053
	(0.89)	(0.99)	(0.17)
N	6246	2974	2639

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01

Table A3.5.4 BISP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV estimates) based on Primary Schooling Gender Gap Residuals: Excluding Balochistan

	Full Sample	Residuals of Primary Enrollment Gender Gap Estimation	
		Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.201**	-0.063	-0.481**
	(-2.05)	(-0.52)	(-2.29)
N	6246	2974	2639

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01

Appendix 3.6. IV probit coefficients from alternate sub-samples: Checking if likely/ less likely Taliban presence (based on Appendix 3.4) is a chance division

1. CDCP – Phase 1 (all 4 provinces)

Table A3.6.1 CDCP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV estimates) based on Primary Female Enrolment Residuals

	Full Sample	Residuals of Female Primary Enrollment Estimation	
		Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.512***	-0.064	-0.760***
	(-3.60)	(-0.27)	(-6.03)
N	7767	3313	3552

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Fig. A3.6.1 Distribution of IV probit coefficients of the effect of conflict on likelihood of receiving CDCP-I transfers from 1000 random combinations of communities into two sub-samples

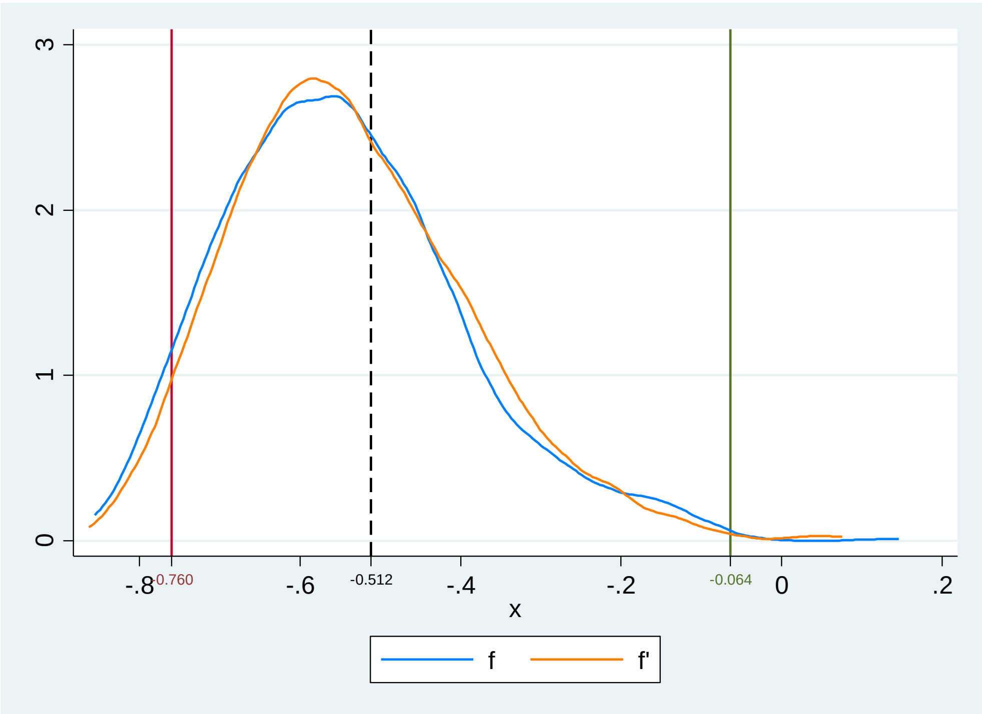


Table A3.6.2 Results from repeated random selection of communities into sub-samples

	No. of Instances (out of 1000)	Percentage
$f \leq -0.760$	48	4.8%
$f' \leq -0.760$	40	4%

$f \geq -0.064$	2	0.2%
$f' \geq -0.064$	3	0.3%
$f \leq -0.760$ and $f' \geq -0.064$	0	0.3%
$f' \leq -0.760$ and f ≥ -0.064	0	0.1%

2. BISP (all 4 provinces) – based on Linear Probability Model coefficients using the ivreg command in STATA

Table A3.6.3 BISP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV LPM estimates) based on Primary Female Enrolment Residuals

	Full Sample	Residuals of Female Primary Enrollment Estimation	
		Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.101**	-0.084**	-0.178
	(-2.24)	(-2.01)	(-1.36)
N	7767	3313	3552

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Fig. A3.6.2 Distribution of IV probit coefficients of the effect of conflict on likelihood of receiving BISP transfers from 1000 random combinations of communities into two sub-samples

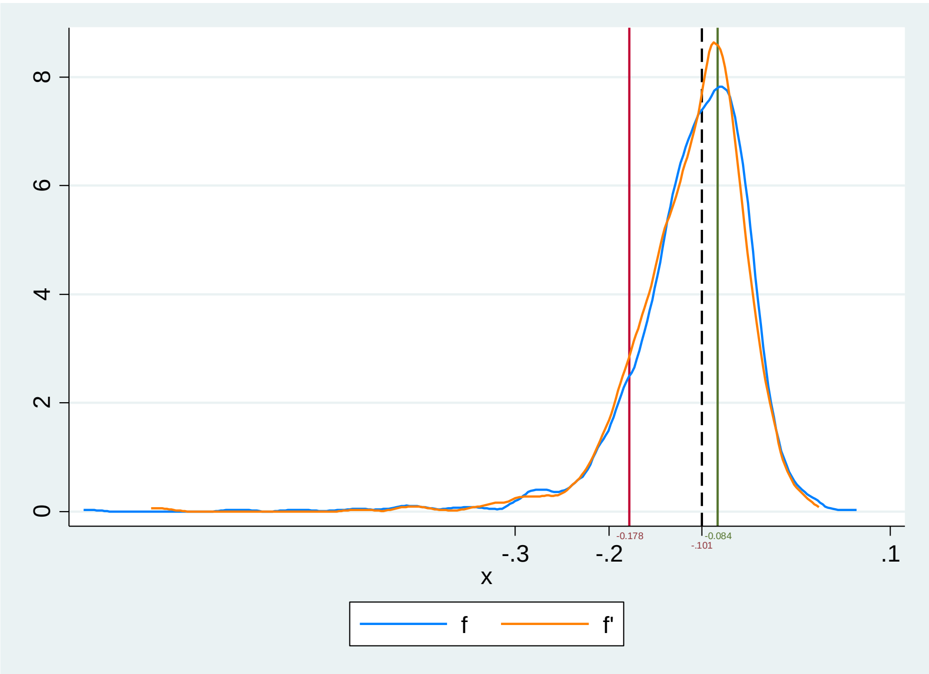


Table A3.6.4 Results from repeated random selection of communities into sub-samples

	No. of Instances (out of 1000)	Percentage
$f \leq -0.178$	113	11.3%
$f' \leq -0.178$	116	11.6%
$f \geq -0.084$	345	34.5%
$f' \geq -0.084$	365	36.5%
$f \leq -0.178$ and $f' \geq -0.084$	105	10.5%
$f' \leq -0.178$ and f ≥ -0.084	112	11.2%

3. CDCP – Phase 1 (excluding Balochistan) – based on Linear Probability Model coefficients using the ivreg command in STATA

Table A3.6.5 CDCP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV probit estimates) based on Primary Female Enrolment Residuals: Excluding Balochistan

	Full Sample	Residuals of Female Primary Enrollment Estimation	
		Taliban likely not present	Taliban likely present
Log (1+n) killings	0.043	0.118*	-0.113
	(1.02)	(1.87)	(-1.32)
N	6246	2741	2872

Marginal effects; t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

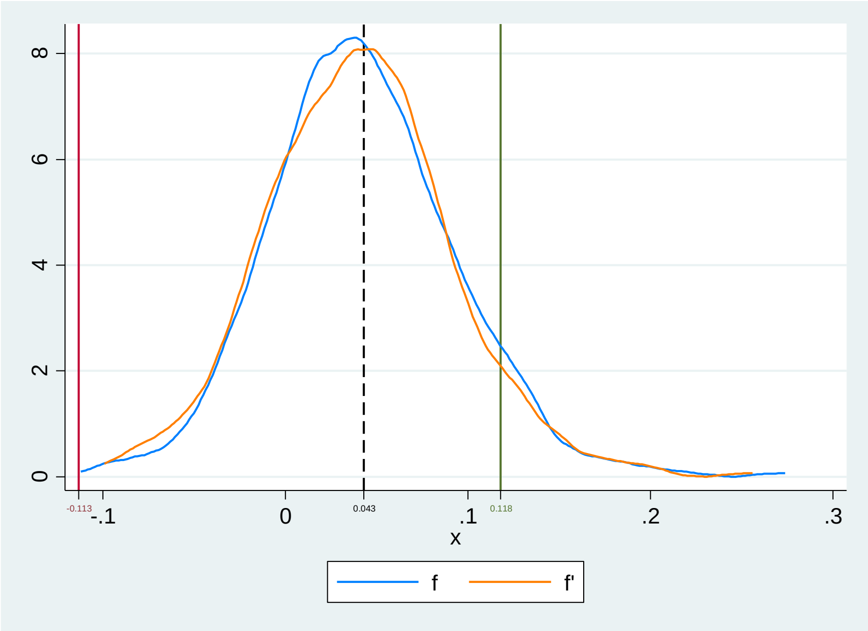


Fig. A3.6.3 Distribution of IV probit coefficients of the effect of conflict on likelihood of receiving CDCP-I transfers from 1000 random combinations of communities into two sub-samples (excluding Balochistan).

Table A3.6.6 Results from repeated random selection of communities into sub-samples

	No. of Instances (out of 1000)	Percentage
$f \leq -0.113$	0	0%
$f' \leq -0.113$	0	0%
$f \geq 0.118$	65	6.5%
$f' \geq 0.118$	78	7.8%
$f \leq -0.113$ and $f' \geq 0.118$	0	0%
$f' \leq -0.113$ and f ≥ 0.118	0	0 %

4. BISP (excluding Balochistan) – based on Linear Probability Model coefficients using the ivreg command in STATA

Here I present results from an IV regression estimation as the IV probit estimation failed to converge in several of the 1000 combinations of the sample based on a random grouping of communities into the two sub-samples. For comparison I provide IV regression coefficients for the effect of conflict on BISP receipts for the full sample, excluding Balochistan and the sub-samples with more/ less likely Taliban presence.

Table A3.6.7 BISP Receipts and Conflict: Linked through the Likely Presence of Armed Groups (IV regression estimates) based on Primary Female Enrolment Residuals: Excluding Balochistan

	Full Sample	Residuals of Female Primary Enrollment Estimation	
		Taliban likely not present	Taliban likely present
Log (1+n) killings	-0.045	-0.039	-0.081
	(-1.64)	(-1.26)	(-1.22)
N	6246	2741	2872

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Fig. A3.6.4 Distribution of IV regression coefficients of the effect of conflict on likelihood of receiving BISP transfers from 1000 random combinations of communities into two sub-samples (excluding Balochistan)

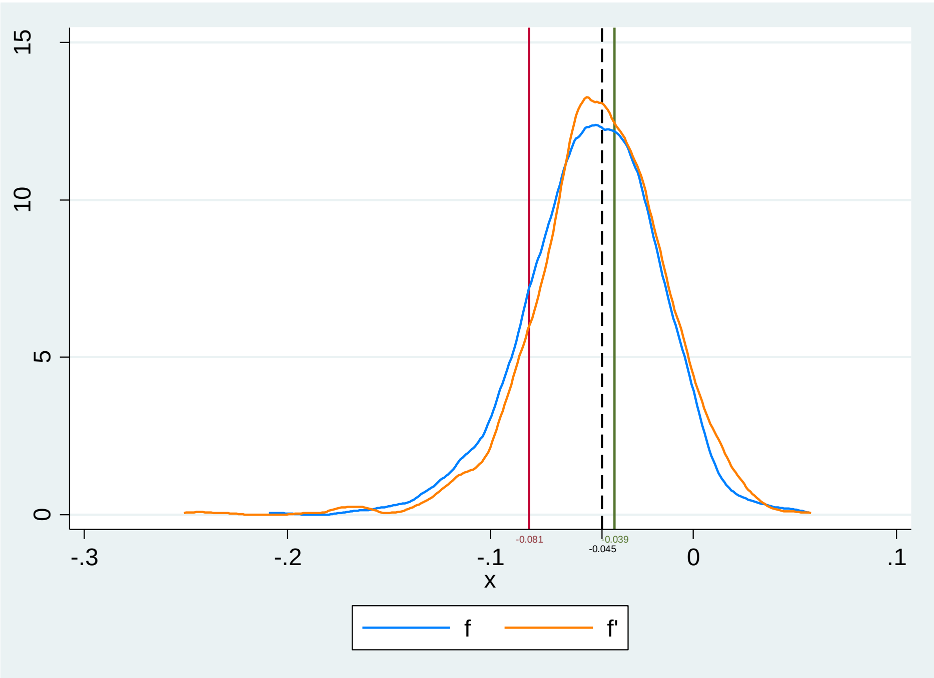


Table A3.6.8 Results from repeated random selection of communities into sub-samples

	No. of Instances (out of 1000)	Percentage
$f \leq -0.081$	161	16.1%
$f' \leq -0.081$	126	12.6%
$f \geq -0.039$	417	41.7%

$f' \geq$ -0.039	379	37.9%
$f \leq$ -0.081 and $f' \geq$ -0.039	159	15.9%
$f' \leq$ -0.081 and f $\geq$ -0.039	124	12.4%

Appendix 3.7. Conflict and Eligibility for BISP and CDCP – I

Table A3.7.1 Effect of Conflict on Alternate Indicators of BISP Eligibility (IV Estimate)

	Female-Headed Household	Female-Headed Household (without remittance)	Landless HH	Landless HH with Female Head	No. of Rooms in the House	Proportion of HH members aged 0 - 12	Value of (pre-flood) Livestock
Conflict-affected Tehsil	0.090	0.080	0.062	0.076	1.355***	-0.031	15033.840
	(1.26)	(1.29)	(0.30)	(1.21)	(2.79)	(-1.03)	(0.18)
Log (1+n) killings	0.023	0.021	0.016	0.020	0.349***	-0.008	3874.849
	(1.24)	(1.32)	(0.30)	(1.22)	(3.29)	(-1.06)	(0.18)
N	7802	7802	7802	7802	7802	7802	7802

Marginal effects; *t* statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.7.2 Effect of Conflict on Alternate Indicators of CDCP I Eligibility in KPK, incl. District Dummies (IV Estimate)

	HH Damage Index	HH Flood Exposure	HH Displaced due to flooding	Duration of Displacement due to flooding
Log (1+n) killings	0.060	0.109	0.056*	-2.425
	(1.34)	(1.16)	(1.75)	(-0.37)
N	1764	1764	1764	1764

Marginal effects; *t* statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.7.3 Effect of Conflict on village-level eligibility for CDCP - Excluding KPK (IV Estimate)

	(1)	(2)	(3)	(4)
Log (1+n) killings	-6.852	-0.948	-1.683	-559.292
	(-0.25)	(-0.22)	(-0.25)	(-0.24)
N	384	384	384	384

Marginal effects; *t* statistics in parentheses
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 4.1. Estimates of effect of Conflict on Access to Remittances: Distance from nearest official border crossing as IV for conflict [log (1+n) killings at sub-district level]

Table A4.1.1 Effect of Conflict on likelihood of receiving remittances: Probit and IV probit estimates

	Probit Estimates				IV Probit Estimates			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log (n+1) killings at tehsil level	0.009***	-0.005	-0.003	-0.006*	0.154***	-0.220**	-0.344**	-0.488***
	(3.15)	(-1.64)	(-0.90)	(-1.88)	(6.18)	(-2.02)	(-2.00)	(-3.38)
Province Dummies		Y	Y	Y		Y	Y	Y
Community Controls			Y	Y			Y	Y
HH Controls				Y				Y
N	7802	7802	7786	7767	7802	7802	7786	7767

Marginal effects; *t* statistics in parentheses
$^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$
Community Controls: Urban/ Rural, topography, distance from administrative headquarters, intra-community linguistic fractionalization, community-level presence of infrastructure and state institutions
Household controls: Household size, Age of head, members' education levels, Farmland ownership, pre-flood livestock value, number of males, number of members over 14, household main occupation and enterprise ownership, female-headed (dummy), Flood-Exposure Index, Flooding Anomaly Index, No. of Contacts outside village (Social Connectedness), Received state transfers through CDCP – I and BISP programmes (dummies)

Table A4.1.2 Effect of Conflict on Amount of remittances received (in PKR): Tobit and IV Tobit estimates

	Tobit Estimates				IV Tobit Estimates			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log (n+1) killings at tehsil level	5354***	-2171	-1837	-3195*	17555***	-11223	-117656***	-38496**
	(3.22)	(-1.17)	(-0.87)	(-1.89)	(5.56)	(-1.01)	(-10.53)	(-2.11)
Province Dummies		Y	Y	Y		Y	Y	Y
Community Controls			Y	Y			Y	Y
HH Controls				Y				Y
N	7796	7796	7780	7761	7796	7796	7780	7761

Marginal effects; *t* statistics in parentheses
$^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$
Controls as in Table A4.1.1

Table A4.1.3 Effects of Flooding Exposure and Flooding Anomaly on Remittance Receipts

	Received Any Remittance (IV Probit estimate)	Amount of Remittances Received (IV Tobit estimate)
Log (n+1) killings at tehsil level	-0.488***	-38496**
	(-3.38)	(-2.11)
Flooding Exposure Index	-0.020	-3640.875
	(-0.41)	(-0.84)
Flooding Anomaly Index	0.189***	15545.088***
	(3.80)	(2.62)
N	7767	7761

Marginal effects; *t* statistics in parentheses
**p*< 0.10, ***p*< 0.05, ****p*< 0.01
Controls as in Table A4.1.1

Table A4.1.4 Formal/ Informal Modes of Money Transfer as a Mechanism

	Any remittance – IV probit estimate			Remittance Amount – IV tobit estimate		
	Full Sample	No HH Bank A/c	HH has Bank A/c	Full Sample	No HH Bank A/c	HH has Bank A/c
Log (n+1) killings at tehsil level	-0.488***	-0.525***	0.185	-38496**	-42500**	28673.905
	(-3.38)	(-3.83)	(0.31)	(-2.11)	(-2.30)	(0.43)
N	7767	6931	817	7761	6925	836

Marginal effects; *t* statistics in parentheses
**p*< 0.10, ***p*< 0.05, ****p*< 0.01
Controls as in Table A4.1.1

Table A4.1.5 Likely presence of TTP (affiliates) as a Mechanism linking Violent Conflict and the Likelihood of Receiving Any Remittances

	Full sample	Residuals of Female Primary Enrollment Estimation	
		TTP likely present	TTP likely not present
Log (n+1) killings at tehsil level	-0.488***	-0.766***	-0.216
	(-3.38)	(-3.76)	(-1.36)
N	7767	3552	4215

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01
Controls as in Table A4.1.1

Table A4.1.6 Likely presence of TTP (affiliates) as a Mechanism linking Violent Conflict and the Amount of Remittances Received

	Full Sample	Residuals of Female Primary Enrollment Estimation	
		TTP likely present	TTP likely not present
Log (n+1) killings at tehsil level	-38496**	67668	-12871
	(-2.11)	(0.87)	(-0.83)
N	7761	3547	4214

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01
Controls as in Table A4.1.1

Table A4.1.7 IV estimate of Effect of Violent Conflict on likelihood of receiving any Remittances across Formal Bank Account Access and Likely presence of TTP

	TTP likely present		TTP likely not present	
	No HH Bank Account	HH has Bank Account	No HH Bank Account	HH has Bank Account
Log (n+1) killings at tehsil level	-0.760***	-0.233	-0.289*	0.629**
	(-4.12)	(-0.07)	(-1.77)	(2.45)
N	3203	338	3728	466

Marginal effects; *t* statistics in parentheses
**p*< 0.10, ***p*< 0.05, ****p*< 0.01
Controls as in Table A4.1.1

Table A4.1.8 IV estimate of Effect of Violent Conflict on Amount of Remittances across Formal Bank Account Access and Likely presence of TTP

	TTP likely present		TTP likely not present	
	No HH Bank Account	HH has Bank Account	No HH Bank Account	HH has Bank Account
Log (n+1) killings at tehsil level	-76796	-34489	-21570	92717
	(-1.20)	(-0.09)	(-1.32)	(1.41)
N	3198	349	3727	487

Marginal effects; *t* statistics in parentheses
**p*< 0.10, ***p*< 0.05, ****p*< 0.01
Controls as in Table A4.1.1

Table A4.1.9 Effect of Conflict on Likelihood of Any Remittance Receipt: Across Food Consumption Expenditure Quintiles

	Full Sample	Monthly per Adult-equivalent Food Consumption Expenditure Quintiles				
		Q1	Q2	Q3	Q4	Q5
Log (n+1) killings at tehsil level	-0.488***	0.664**	-0.701***	-0.652***	-0.195	-0.502***
	(-3.38)	(2.45)	(-4.12)	(-4.29)	(-0.58)	(-3.50)

N	7767	1542	1558	1540	1550	1543

Marginal effects; *t* statistics in parentheses
$^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$
Controls as in Table A4.1.1

Table A4.1.10 Effect of Conflict on Amount of Remittances Received: Across Food Consumption Expenditure Quintiles

	Full Sample	Monthly per Adult-equivalent Food Consumption Expenditure Quintiles				
		Q1	Q2	Q3	Q4	Q5
Log (n+1) killings at tehsil level	-38496**	97156	-76435	-67774**	-15423	-40551**
	(-2.11)	(1.17)	(-1.49)	(-2.10)	(-0.49)	(-2.01)
N	7761	1553	1556	1551	1549	1552

Marginal effects; *t* statistics in parentheses
$^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$
Controls as in Table A4.1.1

Appendix 4.2. Sub-samples based on residuals of the community-level gender gap in primary schooling

I also examine residuals from the estimation of the community-level gender gap in primary schooling (simply measured as the difference in the shares of primary school age boys and girls enrolled in school at the community level) to proxy the likelihood of non-state armed group control.

The underlying assumption is that after controlling for all plausible demand and supply-side factors that determine the gender-gap in primary schooling at the community level[88], the presence of Taliban-affiliate groups would increase the gender gap. As in the case with female primary enrolment above, I divide the sample into two sub-samples: (i) areas less likely to have the control of armed groups, with the residual $v_c \leq 0$ [89], and (ii) areas more likely to have armed non-state groups' control, with positive residuals, $v_c > 0$.

Table A4.2.1. Likely presence of TTP (affiliates) as a Mechanism linking Violent Conflict and the Likelihood of Receiving Any Remittances

	Full sample	Residuals of Primary Enrollment Gender Gap Estimation	
		TTP likely present	TTP likely not present
Log (n+1) killings at tehsil level	-0.431***	-0.528***	-0.339**
	(-3.37)	(-2.58)	(-2.21)
N	7767	4191	3576

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01

Table A4.2.2. Likely presence of TTP (affiliates) as a Mechanism linking Violent Conflict and the Amount of Remittances Received

	Full Sample	Residuals of Primary Enrollment Gender Gap Estimation	
		TTP likely present	TTP likely not present
Log (n+1) killings at tehsil level	-31,298**	-33529	-26982
	(-2.19)	(-1.44)	(-1.63)
N	7761	4188	3573

Marginal effects; t statistics in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01

Table A4.2.3 IV estimate of Effect of Violent Conflict on likelihood of receiving any

[88] Including adult female educational attainment that controls for attitudinal drivers of the gender bias in primary schooling

[89] As Taliban control/ presence would, ceteris paribus, increase the gender gap, in this case *positive* residuals indicate the presence of such groups. In the case of female primary enrolment rates, the presence of armed non state groups *reduced* the value of the dependant variable.

Remittances across Formal Bank Account Access and Likely presence of TTP

	TTP likely present		TTP likely not present	
	No HH Bank Account	HH has Bank Account	No HH Bank Account	HH has Bank Account
Log (n+1) killings at tehsil level	-0.538***	-0.107	-0.400***	0.221
	(-2.71)	(-0.07)	(-2.65)	(0.56)
N	3699	475	3232	340

Marginal effects; *t* statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Controls as in Table A4.1.1

Table A4.2.4 IV estimate of Effect of Violent Conflict on Amount of Remittances across Formal Bank Account Access and Likely presence of TTP

	TTP likely present		TTP likely not present	
	No HH Bank Account	HH has Bank Account	No HH Bank Account	HH has Bank Account
Log (n+1) killings at tehsil level	-31767	17073	-34704**	13231
	(-1.47)	(0.08)	(-2.00)	(0.32)
N	3696	492	3229	344

Marginal effects; *t* statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Controls as in Table A4.1.1

Appendix 5.1. Household and Community correlates of Non-Response on Household Gun Ownership: Probit estimates

	(1)		(2)	
	Coefficient	z	Coefficient	z
Household Size	0.010***	3.84	0.009***	3.66
Urban	-0.008	-0.31	-0.002	-0.07
No. of males with primary Education	0.011***	2.62	0.012***	2.77
No. of females with primary Education	-0.007	-1.59	-0.008*	-1.75
No. of HH members above 14	0.001	0.21	0.000	0.12
Value of livestock before floods (PKR)	-0.000	-0.05	0.000	0.40
Age of HH Head	-0.000*	-1.69	-0.000*	-1.76
Total number of Male members in HH	-0.015***	-3.51	-0.015***	-3.49
Female headed HH (dummy)	-0.016	-1.23	-0.016	-1.24
Landless HH (dummy)	0.001	0.04	0.001	0.09
Marginal farmer (<1.5 acres of land)	-0.035	-1.59	-0.038*	-1.67
Medium Farmer (1.5 – 12.5 acres of land)	0.004	0.22	0.004	0.21
Large farmer (12.5 acres of land)	0.024	0.67	0.021	0.62
HH owns non-agricultural enterprise	-0.003	-0.28	-0.004	-0.34
HH has access to drainage	0.030**	2.22	0.032**	2.43
HH received remittance	0.022**	2.13	0.021**	2.08
Days spent in flood relief camp (displaced)	0.000	0.43	0.000	1.04
Distance from District Capital	0.006	0.09	0.023	0.35
Distance from Province Capital	-0.028	-0.98	-0.008	-0.26
Index of Linguistic Fractionalisation (community)	-0.076	-1.10	-0.070	-1.09
Index of community-level infrastructure	-0.004	-0.43	-0.001	-0.15
Index of presence of state institutions at community levels	-0.001	-0.23	-0.000	-0.18
Distance from nearest Army Cantonment	0.109	0.96	0.034	0.29
Topography: Inland Plain	-0.057	-1.08	-0.047	-0.89
Topography: Coastal Plain	0.000	.	0.000	.
Topography: Plateau	-0.232***	-3.00	-0.216***	-2.64
Topography: Hills	-0.047	-0.75	-0.025	-0.41
Topography: Valley	-0.093	-1.25	-0.067	-0.91
Topography: Mountain	-0.034	-0.45	0.004	0.06
Topography: Desert	0.000	.	0.000	.
Former princely state (dummy)	-0.094	-1.16	-0.072	-0.99
Nation Building District – At risk of radicalisation	0.409***	8.24	0.458***	8.31

Urdu	0.026	0.45	0.020	0.34
Sindhi	0.695***	10.87	0.672***	9.86
Pushto	0.093	1.64	0.061	0.99
Hindko	0.025	0.34	0.008	0.12
Saraiki	-0.006	-0.11	-0.009	-0.16
KPK	0.576***	11.62	0.556***	13.97
Balochistan	-0.360***	-5.36	-0.230*	-1.82
Conflict-affected sub-district (dummy)	0.034	1.18		
Nearest distance to Afghanistan-Pakistan border			-0.089*	-1.81
N	4854		4854	
pseudo R^2	0.4815		0.4851	

Marginal effects; *t* statistics in second column
(d) for discrete change of dummy variable from 0 to 1
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 5.2: Correlates of the community-level share of households that own guns

Table A.5.2. Correlates of the community-level share of gun-owning households: Tobit Estimates

	(1)		(2)	
	Coefficient	t	Coefficient	t
Urban	0.012	0.34	0.004	0.09
Share of female-headed HHs	0.068	0.64	0.092	0.82
Share of landless HHs	0.041	0.56	0.038	0.51
Share of HHS with land owning ≥ 1.5 acres	0.254***	2.85	0.262***	2.80
Share of HHs that receive remittances	0.061	0.63	0.022	0.22
Distance from District Capital	-0.015	-0.46	-0.029	-0.81
Distance from Province Capital	-0.003	-0.23	0.013	0.98
Index of Linguistic Fractionalisation	-0.003	-0.06	-0.032	-0.69
Index of community-level infrastructure	0.001	0.13	0.003	0.55
Index of presence of state institutions at community level	0.003	1.21	0.004	1.36
Distance from nearest Army Cantonment	0.033	0.88	0.042	1.09
Topography: Inland Plain	0.078	0.66	0.079	0.63
Topography: Coastal Plain	0.031	0.25	0.047	0.34
Topography: Plateau	0.261*	1.80	0.274*	1.78
Topography: Hills	0.192	1.49	0.234*	1.70
Topography: Valley	0.392***	2.95	0.409***	2.87
Topography: Mountain	0.273**	2.17	0.293**	2.18
Topography: Desert	0.098	0.64	0.037	0.23
Nation Building District – At risk of radicalisation	0.067**	2.40	0.018	0.67
Former princely state (dummy)	0.026	0.63	0.067	1.59
Nearest distance to Af-Pak border	-0.080***	-5.29		
Conflict-affected tehsil (dummy)			0.019	0.77
Punjab	0.138**	2.44	0.047	0.84
Sindh	0.391***	6.71	0.210***	4.43
Balochistan	0.467***	9.55	0.372***	8.04
Constant	-0.272*	-1.80	-0.404**	-2.49
N	494		494	
pseudo R^2	0.8576		0.7852	

Marginal effects; *t* statistics in second column

(d) for discrete change of dummy variable from 0 to 1

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

230 observations censored at mean_gun ≤ 0

1 observation censored at mean_gun ≥ 1

263 uncensored observations

3 observations dropped due to non-response

Appendix 5.3. Robustness check: Alternate estimation of Covariate Balanced Propensity Score among households with > 1.5 acres of land and who did not own guns before the 2010 floods

Table A.5.3.1 Estimation of Covariate Balanced Propensity Score Matching for CDCP – I Receipts. Probit Model Results. (Only households with > 1.5 acres of land and who did not own guns before the 2010 floods)

Independent Variables	**Coefficient**	**z**
	0.012	1.16
Flood Exposure Index (HH)	0.158***	4.32
Rural	0.122	0.43
HH has Bank Account	-0.099	-0.85
Number of Rooms in the House	-0.053	-1.50
Acres of farmland owned	0.004	1.03
HH size	0.007	0.54
Age of head of Household	0.014***	4.78
Livestock Value in PKR (pre Flood)	-0.000	-0.90
No. of males who can read in the HH	0.159***	4.01
No. of females who can read in the HH	-0.009	-0.18
HH social capital measure	-0.002	-0.36
KPK	0.457***	2.80
Sindh	0.709***	6.52
Balochistan	0.016	0.15
Constant	-0.900***	-2.63
Number of observations	1193	
LR Chi-squared (37)	131.24	
Prob. > Chi-sq.	0.0000	
Pseudo R-squared	0.090	
Details of Propensity Score		
Sum of Weight	1193	
Mean	0.698	
Std. Dev.	0.149	
Variance	0.022	
Skewness	-0.296	
Kurtosis	2.388	

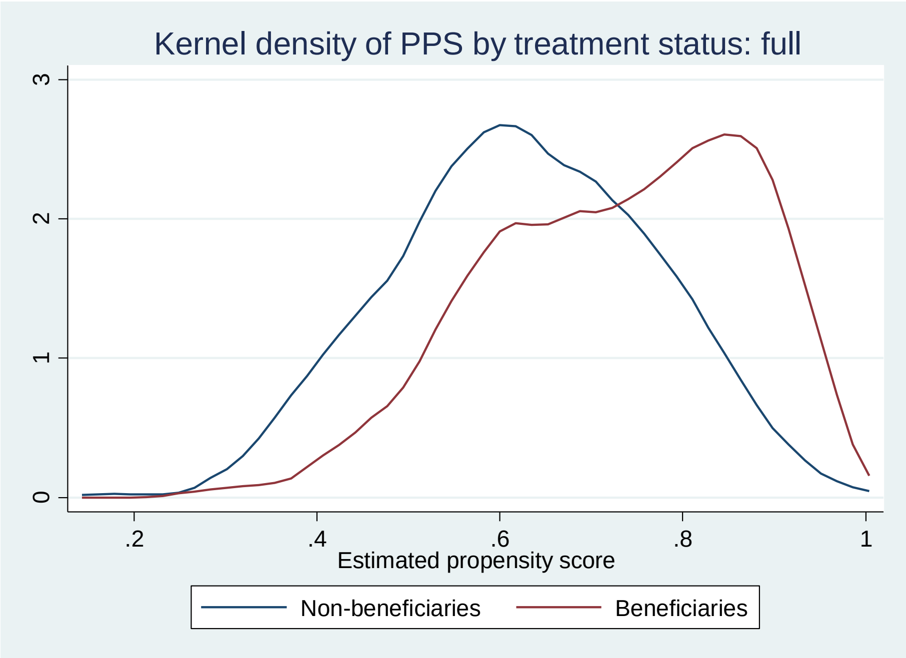
The Covariate Balanced Propensity Score was calculated using the 'pscore' command in STATA 13 software. This resulted in creating an optimal 6 blocks; the CBPS ensures that the balancing property of the Propensity Score is satisfied in every block. Table 4 below shows the inferior bound, and the number of treated and the number of controls in each block.

Table A3.2 Nos. of Controls/ Treated in each Block for PSM

Inferior of Block of Propensity Score	**Non-recipients (Control)**	**Recipients (Treated)**	**Tota l**
0	1	0	1
0.2	19	10	29
0.4	141	169	310
0.6	158	343	501
0.8	36	212	248
0.9	6	98	104
Total	361	832	1,193

I use nearest neighbour matching, matching each treatment observation with the five control observations that have the closest propensity score as per the procedure outlined in Quisumbing et al. (2011). Figure A3.1 below depicts the kernel density of propensity scores for beneficiaries and non-beneficiaries, indicating considerable overlap and common support between the two to enable meaningful matching across the parameters listed above.

Figure A3.1. Kernel Density of Propensity Scores by Treatment Status (Only households with > 1.5 acres of land and who did not own guns before the 2010 floods)



Appendix 5.4 – Differences (on observable characteristics) between Households that acquired guns before and after the 2010 floods

	Mean Difference (HHs that owned guns before 2010 floods – HHs that acquired them after)	t
No. of males with primary Education	0.00326	(0.01)
No. of females with primary Education	0.00939	(0.29)
No. of HH members above 14	-0.261	(-1.51)
Value of livestock before floods (PKR)	-0.145	(-1.19)
Age of HH Head	0.0631	(0.28)
Total number of Male members in HH	-10372.0	(-0.58)
Female headed HH (dummy)	1.360	(0.96)
Landless HH (dummy)	-0.0370	(-0.17)
Marginal farmer (<1.5 acres of land)	0.0198	(0.87)
Medium Farmer (1.5 – 12.5 acres of land)	-0.0547	(-1.02)
Large farmer (12.5 acres of land)	0.00952	(0.46)
HH owns non-agricultural enterprise	0.0563	(1.19)
HH has access to drainage	0.0123	(0.38)
HH received remittance	0.0180	(0.40)
Days spent in flood relief camp (displaced)	-0.0212	(-0.47)
Distance from District Capital	0.00451	(0.16)
Distance from Province Capital	-0.705	(-0.10)
Index of Linguistic Fractionalisation	-0.0891***	(-2.62)
Index of community-level infrastructure	0.0713	(0.71)
Index of presence of state institutions at community level	0.0516**	(2.06)
Distance from nearest Army Cantonment	-0.239	(-1.05)
Topography: Inland Plain	-0.199	(-0.47)
Topography: Coastal Plain	0.0375	(1.11)
Topography: Plateau	0.0106	(0.23)
Topography: Hills	0.000447	(0.03)
Topography: Valley	-0.0360***	(-3.56)
Topography: Mountain	0.0125	(0.58)
Topography: Desert	-0.00206	(-0.10)
Former princely state (dummy)	0.0101	(0.28)
Nation Building District – At risk of radicalization	0.00295	(0.54)
Urdu	0.0130	(0.36)
Sindhi	0.105**	(2.54)
Pushto	0.00554	(0.23)
Balochi	-0.0733	(-1.38)
Hindko	-0.0202	(-0.55)
Saraiki	-0.0444	(-1.15)
Brahvi	0.0177	(1.33)

Other Language	0.0690**	(2.05)
KPK	0.0171	(0.70)
Sindh	0.0310*	(1.78)
Balochistan	0.0387	(1.13)
No. of males with primary Education	0.0447	(0.95)
No. of females with primary Education	-0.0599	(-1.13)
No. of HH members above 14	-0.0235	(-1.00)
HH received BISP Transfer	-0.0379	(-1.09)
HH received CDCP – I transfer	-0.00849	(-0.16)
N	777	

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 6.1. Causal Effects of Flood Exposure Index (Linear transformation) on Household and Individual Migration

Table A6.1.1 Effects of Flooding Exposure and the degree of Flooding Anomaly on Any Household Migration: Probit Estimates

	(1)	(2)	(3)	(4)
Flooding Exposure Index (linear)	0.025***	0.024***	0.023***	0.022***
	(19.31)	(15.03)	(11.38)	(11.14)
Flooding Anomaly Index	-0.035***	-0.033***	-0.033***	-0.032***
	(-4.15)	(-3.99)	(-3.75)	(-3.61)
Province dummies	-	Yes	Yes	Yes
Community Controls	-	-	Yes	Yes
Household Controls	-	-	-	Yes
N	7802	7802	7786	7767
pseudo R^2	0.2097	0.2411	0.2980	0.3081

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Standard Errors clustered at the community level
Community Controls: Urban/ Rural, topography, occupational characteristics, distance from administrative headquarters, social connectedness outside the community, intra-community linguistic fractionalization, community-level presence of infrastructure and state institutions, community-level adult education characteristics, community access to electricity, drainage, sex ratio
Household controls: Household size, Age of head, members' education levels, Farmland ownership, Number of rooms in the house, pre-flood livestock value, number of males, number of members over 14, household main occupation and enterprise ownership, female-headed (dummy), flood-induced displacement status

Table A6.1.2 Effects of Flooding Exposure and the degree of Flooding Anomaly on Any Individual^ Migration: Probit Estimates

	(1)	(2)	(3)	(4)
Flooding Exposure Index (linear)	0.026***	0.025***	0.022***	0.021***
	(51.84)	(37.94)	(25.76)	(24.07)
Flooding Anomaly Index	-0.040***	-0.037***	-0.042***	-0.037***
	(-10.70)	(-8.24)	(-8.11)	(-7.18)
Province dummies	-	-	Yes	Yes
Controls	-	-	-	Yes
N	30697	30697	30623	30554
pseudo R^2	0.2324	0.2630	0.3073	0.3217

Marginal effects; *t* statistics in parentheses

$^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$
^ Estimated for all individuals aged 13 and above
Standard Errors clustered at the household level
Controls: In addition to the community and household-level controls listed in table 8, I control for individual characteristics – Age, Gender and Educational Attainment (categories)

Table A6.1.3 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Rural v/s Urban

	Total	Rural	Urban
Flooding Exposure Index (linear)	0.022***	0.021***	0.038***
	(11.14)	(10.12)	(9.55)
Flooding Anomaly Index	-0.032***	-0.026***	-0.008
	(-3.61)	(-2.96)	(-0.40)
Province dummies	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes
N	7767	7049	684

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
$^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$

Table A6.1.4 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Land Ownership Status

	Total	Landless Households	Own-land cultivating Households	Rentier Landlord Households
Flooding Exposure Index (linear)	0.022***	0.020***	0.023***	0.038***
	(11.14)	(9.32)	(9.42)	(8.03)
Flooding Anomaly Index	-0.032***	-0.032***	-0.025*	-0.007
	(-3.61)	(-3.41)	(-1.90)	(-0.33)
Province dummies	Yes	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes	Yes
N	7767	5208	2198	357

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
$^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$

Table A6.1.5 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Demographic Characteristics

	Total	Female Headed	Age of Household Head		
			Below 40	40 – 59	60 and

		Households			above
Flooding Exposure Index (linear)	0.022***	0.022***	0.021***	0.022***	0.024***
	(11.14)	(7.29)	(9.21)	(10.32)	(8.91)
Flooding Anomaly Index	-0.032***	0.019	-0.039***	-0.029***	-0.016
	(-3.61)	(1.03)	(-3.42)	(-2.98)	(-1.36)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes	Yes	Yes
N	7767	720	3147	3220	1400

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.1.6 Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Gender

	Total	Male	Female
Flooding Exposure Index (linear)	0.026***	0.021***	0.021***
	(51.84)	(22.57)	(22.94)
Flooding Anomaly Index	-0.040***	-0.038***	-0.037***
	(-10.70)	(-7.10)	(-6.56)
Province dummies	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes
N	30554	15227	15327

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.1.7. Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Age Group

	Total	Age Group			
		13 - 25	26 - 40	41 - 55	56 and above
Flooding Exposure Index (linear)	0.026***	0.020***	0.022***	0.020***	0.024***
	(51.84)	(18.98)	(20.42)	(15.75)	(15.87)
Flooding Anomaly Index	-0.040***	-0.040***	-0.034***	-0.039***	-0.029***
	(-10.70)	(-6.18)	(-5.32)	(-5.46)	(-3.27)
Province	Yes	Yes	Yes	Yes	Yes

dummies					
Controls – as listed in table 9	Yes	Yes	Yes	Yes	Yes
N	30554	13016	7951	5749	3838

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.1.8 Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Education Level

	Total	Education Level			
		Illiterate	Primary	Secondary	Higher
Flooding Exposure Index (linear)	0.026***	0.021***	0.019***	0.025***	0.021***
	(51.84)	(21.68)	(11.05)	(17.18)	(9.89)
Flooding Anomaly Index	-0.040***	-0.043***	-0.025***	-0.029***	-0.042***
	(-10.70)	(-7.10)	(-2.90)	(-3.74)	(-3.84)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes	Yes	Yes
N	30554	19988	4210	4865	1490

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.1.9 Marginal Effect of Flooding Indices on Choice of Urban Migration Destination: Probit Estimate – All individual migrants

	Urban Migration Destination Probit Estimate	Distance to Migration Destination Ordinal Probit Estimate
Flooding Exposure Index (linear)	-0.002	0.005***
	(-1.22)	(4.07)
Flooding Anomaly Index	-0.010	0.044***
	(-0.87)	(4.60)
Province dummies	Yes	Yes
Controls – as listed in table 9	Yes	Yes
N	16490	16466

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 6.2. Causal Effects of Flooding Exposure sub-Indices [Community-level Depth and Duration (of floodwater) scores] on Household and Individual Migration

Table A6.2.1 Effects of Flooding Exposure and the degree of Flooding Anomaly on Any Household Migration: Probit Estimates

	(1)	(2)	(3)	(4)
Duration Score (community-level)	0.131***	0.114***	0.141***	0.143***
	(15.98)	(7.51)	(7.39)	(7.56)
Depth Score (community-level)	0.026***	0.039***	0.022**	0.018*
	(3.19)	(4.09)	(2.18)	(1.80)
Flooding Anomaly Index	-0.031***	-0.031***	-0.029***	-0.028***
	(-3.86)	(-3.42)	(-3.22)	(-3.09)
Province dummies	-	Yes	Yes	Yes
Community Controls	-	-	Yes	Yes
Household Controls	-	-	-	Yes
N	7802	7802	7786	7767
pseudo R^2	0.2097	0.2411	0.2980	0.3081

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Standard Errors clustered at the community level
Community Controls: Urban/ Rural, topography, occupational characteristics, distance from administrative headquarters, social connectedness outside the community, intra-community linguistic fractionalization, community-level presence of infrastructure and state institutions, community-level adult education characteristics, community access to electricity, drainage, sex ratio
Household controls: Household size, Age of head, members' education levels, Farmland ownership, Number of rooms in the house, pre-flood livestock value, number of males, number of members over 14, household main occupation and enterprise ownership, female-headed (dummy), flood-induced displacement status

Table A6.2.2 Effects of Flooding Exposure and the degree of Flooding Anomaly on Any Individual^ Migration: Probit Estimates

	(1)	(2)	(3)	(4)
Duration Score (community-level)	0.132***	0.108***	0.116***	0.117***
	(30.65)	(14.42)	(11.86)	(12.04)
Depth Score (community-level)	0.030***	0.048***	0.037***	0.031***
	(7.25)	(9.79)	(6.97)	(5.90)
Flooding Anomaly	-0.036***	-0.034***	-0.039***	-0.034***

Index				
	(-9.36)	(-6.65)	(-7.04)	(-6.29)
Province dummies	-	-	Yes	Yes
Controls	-	-	-	Yes
N	30697	30697	30623	30554
pseudo R^2	0.2324	0.2630	0.3073	0.3217

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
^ Estimated for all individuals aged 13 and above
Standard Errors clustered at the household level
Controls: In addition to the community and household-level controls listed in table 8, I control for individual characteristics – Age, Gender and Educational Attainment (categories)

Table A6.2.3 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Rural v/s Urban

	Total	Rural	Urban
Duration Score (community-level)	0.131^{***}	0.138^{***}	0.196^{***}
	(15.98)	(6.74)	(4.34)
Depth Score (community-level)	0.026^{***}	0.019	0.035^{**}
	(3.19)	(1.64)	(2.21)
Flooding Anomaly Index	-0.031^{***}	-0.020^{**}	-0.013
	(-3.86)	(-2.29)	(-0.52)
Province dummies	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes
N	7767	7049	684

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.2.4 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Land Ownership Status

	Total	Landless Households	Own-land cultivating Households	Rentier Landlord Households
Duration Score (community-level)	0.131^{***}	0.127^{***}	0.163^{***}	0.169^{***}
	(15.98)	(5.93)	(6.27)	(4.03)
Depth Score (community-level)	0.026^{***}	0.019^{*}	0.015	0.044^{**}
	(3.19)	(1.67)	(1.06)	(2.03)
Flooding Anomaly	-0.031^{***}	-0.028^{***}	-0.019	0.000

Index				
	(-3.86)	(-2.92)	(-1.54)	(0.01)
Province dummies	Yes	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes	Yes
N	7767	5208	2198	357

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.2.5 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Demographic Characteristics

	Total	Female Headed Households	Age of Household Head		
			Below 40	40 – 59	60 and above
Duration Score (community-level)	0.131***	0.079**	0.157***	0.137***	0.118***
	(15.98)	(2.21)	(6.48)	(6.96)	(4.76)
Depth Score (community-level)	0.026***	0.059***	0.007	0.019*	0.043***
	(3.19)	(3.34)	(0.54)	(1.78)	(3.12)
Flooding Anomaly Index	-0.031***	0.030	-0.038***	-0.024**	-0.011
	(-3.86)	(1.57)	(-3.26)	(-2.36)	(-0.92)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes	Yes	Yes
N	7767	720	3147	3220	1400

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.2.6 Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Gender

	Total	Male	Female
Duration Score (community-level)	0.132***	0.118***	0.114***
	(30.65)	(11.71)	(11.12)
Depth Score (community-level)	0.030***	0.028***	0.035***
	(7.25)	(5.06)	(6.24)
Flooding Anomaly Index	-0.036***	-0.035***	-0.035***

	(-9.36)	(-6.20)	(-5.79)
Province dummies	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes
N	30554	15227	15327

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.2.7. Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Age Group

	Total	Age Group			
		13 - 25	26 - 40	41 - 55	56 and above
Duration Score (community-level)	0.132***	0.108***	0.143***	0.107***	0.107***
	(30.65)	(9.04)	(11.55)	(7.87)	(6.35)
Depth Score (community-level)	0.030***	0.033***	0.021***	0.028***	0.051***
	(7.25)	(5.04)	(3.22)	(3.91)	(5.81)
Flooding Anomaly Index	-0.036***	-0.036***	-0.032***	-0.037***	-0.025***
	(-9.36)	(-5.40)	(-4.72)	(-4.85)	(-2.69)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes	Yes	Yes
N	30554	13016	7951	5749	3838

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.2.8 Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Education Level

	Total	Education Level			
		Illiterate	Primary	Secondary	Higher
Duration Score (community-level)	0.132***	0.113***	0.113***	0.135***	0.091***
	(30.65)	(10.51)	(6.70)	(8.81)	(4.20)
Depth Score (community-level)	0.030***	0.033***	0.031***	0.028***	0.033***
	(7.25)	(5.62)	(3.49)	(3.33)	(2.97)

Flooding Anomaly Index	-0.036***	-0.041***	-0.019**	-0.027***	-0.036***
	(-9.36)	(-6.45)	(-2.11)	(-3.28)	(-3.25)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes	Yes	Yes
N	30554	19988	4210	4865	1490

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.2.9 Marginal Effect of Flooding Indices on Choice of Urban Migration Destination: Probit Estimate – All individual migrants

	Urban Migration Destination Probit Estimate	Distance to Migration Destination Ordinal Probit Estimate
Duration Score (community-level)	-0.009	0.030**
	(-0.54)	(2.08)
Depth Score (community-level)	-0.009	0.011
	(-0.98)	(1.31)
Flooding Anomaly Index	-0.011	0.045***
	(-0.99)	(4.69)
Province dummies	Yes	Yes
Controls – as listed in table 9	Yes	Yes
N	16490	16490

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 6.3. Causal Effects of Flood Exposure Index (Household Level) on Household and Individual Migration

Table A6.3.1 Effects of Flooding Exposure and the degree of Flooding Anomaly on Any Household Migration: Probit Estimates

	(1)	(2)	(3)	(4)
Flooding Exposure Index (HH level)	0.167***	0.135***	0.114***	0.111***
	(22.00)	(16.70)	(13.60)	(13.60)
Flooding Anomaly Index	-0.045***	-0.031***	-0.041***	-0.038***
	(-5.32)	(-3.62)	(-4.53)	(-4.30)
Province dummies	-	Yes	Yes	Yes
Community Controls	-	-	Yes	Yes
Household Controls	-	-	-	Yes
N	7802	7802	7786	7767
pseudo R^2	0.2097	0.2411	0.2980	0.3081

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Standard Errors clustered at the community level
Community Controls: Urban/ Rural, topography, occupational characteristics, distance from administrative headquarters, social connectedness outside the community, intra-community linguistic fractionalization, community-level presence of infrastructure and state institutions, community-level adult education characteristics, community access to electricity, drainage, sex ratio
Household controls: Household size, Age of head, members' education levels, Farmland ownership, Number of rooms in the house, pre-flood livestock value, number of males, number of members over 14, household main occupation and enterprise ownership, female-headed (dummy), flood-induced displacement status

Table A6.3.2 Effects of Flooding Exposure and the degree of Flooding Anomaly on Any Individual^ Migration: Probit Estimates

	(1)	(2)	(3)	(4)
Flooding Exposure Index (HH level)	0.179***	0.143***	0.116***	0.110***
	(44.84)	(32.25)	(23.37)	(22.13)
Flooding Anomaly Index	-0.051***	-0.035***	-0.048***	-0.043***
	(-12.37)	(-7.77)	(-9.22)	(-8.24)
Province dummies	-	-	Yes	Yes
Controls	-	-	-	Yes
N	30697	30697	30623	30554
pseudo R^2	0.2324	0.2630	0.3073	0.3217

Marginal effects; *t* statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
^ Estimated for all individuals aged 13 and above
Standard Errors clustered at the household level
Controls: In addition to the community and household-level controls listed in table 8, I control for individual characteristics – Age, Gender and Educational Attainment (categories)

Table A6.3.3 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Rural v/s Urban

	Total	Rural	Urban
Flooding Exposure Index (HH level)	0.111***	0.108***	0.122***
	(13.60)	(12.73)	(5.53)
Flooding Anomaly Index	-0.038***	-0.031***	-0.005
	(-4.30)	(-3.53)	(-0.20)
Province dummies	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes
N	7767	7049	684

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.3.4 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Land Ownership Status

	Total	Landless Households	Own-land cultivating Households	Rentier Landlord Households
Flooding Exposure Index (HH level)	0.111***	0.113***	0.098***	0.132***
	(13.60)	(12.20)	(8.84)	(5.43)
Flooding Anomaly Index	-0.038***	-0.037***	-0.029**	-0.020
	(-4.30)	(-4.09)	(-2.13)	(-0.88)
Province dummies	Yes	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes	Yes
N	7767	5208	2198	357

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.3.5 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Demographic Characteristics

	Total	Female Headed	Age of Household Head		
			Below 40	40 – 59	60 and

		Households			above
Flooding Exposure Index (HH level)	0.111***	0.101***	0.111***	0.111***	0.112***
	(13.60)	(6.36)	(10.03)	(12.05)	(8.54)
Flooding Anomaly Index	-0.038***	0.016	-0.046***	-0.035***	-0.024*
	(-4.30)	(0.77)	(-3.91)	(-3.53)	(-1.95)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes	Yes	Yes
N	7767	720	3147	3220	1400

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.3.6 Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Gender

	Total	Male	Female
Flooding Exposure Index (HH level)	0.179***	0.107***	0.114***
	(44.84)	(20.56)	(21.51)
Flooding Anomaly Index	-0.051***	-0.044***	-0.042***
	(-12.37)	(-8.21)	(-7.47)
Province dummies	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes
N	30554	15227	15327

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.3.7. Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Age Group

	Total	Age Group			
		13 - 25	26 - 40	41 - 55	56 and above
Flooding Exposure Index (HH level)	0.179***	0.115***	0.107***	0.107***	0.110***
	(44.84)	(19.26)	(16.16)	(15.59)	(12.51)
Flooding Anomaly Index	-0.051***	-0.044***	-0.041***	-0.044***	-0.037***
	(-12.37)	(-6.93)	(-6.21)	(-6.15)	(-4.28)
Province	Yes	Yes	Yes	Yes	Yes

dummies					
Controls – as listed in table 9	Yes	Yes	Yes	Yes	Yes
N	30554	13016	7951	5749	3838

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.3.8 Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Education Level

	Total	Education Level			
		Illiterate	Primary	Secondary	Higher
Flooding Exposure Index (HH level)	0.179***	0.111***	0.095***	0.122***	0.094***
	(44.84)	(20.17)	(11.37)	(16.50)	(9.00)
Flooding Anomaly Index	-0.051***	-0.049***	-0.027***	-0.034***	-0.045***
	(-12.37)	(-8.18)	(-3.19)	(-4.27)	(-4.14)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes	Yes	Yes
N	30554	19988	4210	4865	1490

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.3.9 Marginal Effect of Flooding Indices on Choice of Urban Migration Destination: Probit Estimate – All individual migrants

	Urban Migration Destination Probit Estimate	Distance to Migration Destination Ordinal Probit Estimate
Flooding Exposure Index (HH level)	-0.019*	0.016*
	(-1.89)	(1.82)
Flooding Anomaly Index	-0.010	0.044***
	(-0.93)	(4.57)
Province dummies	Yes	Yes
Controls – as listed in table 9	Yes	Yes
N	16490	16466

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 6.4. Causal Effects of Flooding Anomaly sub-Indices (Standardized Rainfall Deviation and Standardized Nearest Distance to River) on Household and Individual Migration

Table A6.4.1 Effects of Flooding Exposure and the degree of Flooding Anomaly on Any Household Migration: Probit Estimates

	(1)	(2)	(3)	(4)
Flooding Exposure Index	0.237***	0.210***	0.202***	0.196***
	(26.65)	(16.84)	(13.95)	(13.62)
Rainfall deviation (standardized)	-0.014	-0.018	-0.038***	-0.039***
	(-1.07)	(-1.08)	(-2.64)	(-2.71)
Distance from River (standardized)	-0.050***	-0.033***	-0.028**	-0.025**
	(-3.88)	(-2.95)	(-2.28)	(-2.12)
Province dummies	-	Yes	Yes	Yes
Community Controls	-	-	Yes	Yes
Household Controls	-	-	-	Yes
N	7802	7802	7786	7767
pseudo R^2	0.2097	0.2411	0.2980	0.3081

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Standard Errors clustered at the community level
Community Controls: Urban/ Rural, topography, occupational characteristics, distance from administrative headquarters, social connectedness outside the community, intra-community linguistic fractionalization, community-level presence of infrastructure and state institutions, community-level adult education characteristics, community access to electricity, drainage, sex ratio
Household controls: Household size, Age of head, members' education levels, Farmland ownership, Number of rooms in the house, pre-flood livestock value, number of males, number of members over 14, household main occupation and enterprise ownership, female-headed (dummy), flood-induced displacement status

Table A6.4.2 Effects of Flooding Exposure and the degree of Flooding Anomaly on Any Individual^ Migration: Probit Estimates

	(1)	(2)	(3)	(4)
Flooding Exposure Index	0.247***	0.221***	0.203***	0.193***
	(59.76)	(36.38)	(25.73)	(24.16)
Rainfall deviation (standardized)	-0.020***	-0.020***	-0.032***	-0.031***
	(-3.83)	(-2.85)	(-4.09)	(-3.95)

Distance from River (standardized)	-0.054***	-0.040***	-0.046***	-0.040***
	(-9.48)	(-6.92)	(-7.18)	(-6.28)
Province dummies	-	-	Yes	Yes
Controls	-	-	-	Yes
N	30697	30697	30623	30554
pseudo R^2	0.2324	0.2630	0.3073	0.3217

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
^ Estimated for all individuals aged 13 and above
Standard Errors clustered at the household level
Controls: In addition to the community and household-level controls listed in table 8, I control for individual characteristics – Age, Gender and Educational Attainment (categories)

Table A6.4.3 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Rural v/s Urban

	Total	Rural	Urban
Flooding Exposure Index	0.196***	0.193***	0.259***
	(13.62)	(12.96)	(8.01)
Rainfall deviation (standardized)	-0.039***	-0.036**	-0.009
	(-2.71)	(-2.52)	(-0.17)
Distance from River (standardized)	-0.025**	-0.017	0.030
	(-2.12)	(-1.34)	(1.41)
Province dummies	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes
N	7767	7049	684

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.4.4 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Land Ownership Status

	Total	Landless Households	Own-land cultivating Households	Rentier Landlord Households
Flooding Exposure Index	0.196***	0.181***	0.220***	0.238***
	(13.62)	(12.12)	(10.91)	(6.47)
Rainfall deviation (standardized)	-0.039***	-0.033**	-0.049**	-0.045
	(-2.71)	(-2.08)	(-2.46)	(-1.16)

Distance from River (standardized)	-0.025**	-0.026**	-0.019	0.017
	(-2.12)	(-2.10)	(-1.14)	(0.56)
Province dummies	Yes	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes	Yes
N	7767	5208	2198	357

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.4.5 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Demographic Characteristics

	Total	Female Headed Households	Age of Household Head		
			Below 40	40 – 59	60 and above
Flooding Exposure Index	0.196***	0.212***	0.200***	0.185***	0.216***
	(13.62)	(9.30)	(11.19)	(11.13)	(11.00)
Rainfall deviation (standardized)	-0.039***	0.031	-0.052***	-0.032**	-0.028
	(-2.71)	(1.16)	(-2.61)	(-2.01)	(-1.41)
Distance from River (standardized)	-0.025**	0.031	-0.034**	-0.024*	-0.006
	(-2.12)	(1.31)	(-2.32)	(-1.79)	(-0.35)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes	Yes	Yes
N	7767	720	3147	3220	1400

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.4.6 Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Gender

	Total	Male	Female
Flooding Exposure Index	0.193***	0.186***	0.201***
	(24.16)	(22.19)	(23.54)
Rainfall deviation (standardized)	-0.031***	-0.029***	-0.034***
	(-3.95)	(-3.56)	(-3.95)
Distance from River	-0.040***	-0.041***	-0.039***

(standardized)			
	(-6.28)	(-6.30)	(-5.68)
Province dummies	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes
N	30554	15227	15327

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.4.7. Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Age Group

	Total	Age Group			
		13 - 25	26 - 40	41 - 55	56 and above
Flooding Exposure Index	0.193***	0.188***	0.201***	0.177***	0.224***
	(24.16)	(19.41)	(19.82)	(15.68)	(15.39)
Rainfall deviation (standardized)	-0.031***	-0.037***	-0.027***	-0.028***	-0.023*
	(-3.95)	(-3.74)	(-2.71)	(-2.61)	(-1.78)
Distance from River (standardized)	-0.040***	-0.039***	-0.039***	-0.046***	-0.032***
	(-6.28)	(-5.03)	(-4.79)	(-5.13)	(-2.83)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes	Yes	Yes
N	30554	13016	7951	5749	3838

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.4.8 Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Education Level

	Total	Education Level			
		Illiterate	Primary	Secondary	Higher
Flooding Exposure Index	0.193***	0.195***	0.192***	0.194***	0.160***
	(24.16)	(21.80)	(13.19)	(16.25)	(10.30)
Rainfall deviation (standardized)	-0.031***	-0.038***	-0.032**	-0.000	-0.025
	(-3.95)	(-4.29)	(-2.42)	(-0.00)	(-1.35)

Distance from River (standardized)	-0.040***	-0.047***	-0.012	-0.046***	-0.045***
	(-6.28)	(-6.50)	(-1.08)	(-4.32)	(-3.27)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes	Yes	Yes
N	30554	19988	4210	4865	1490

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.4.9 Marginal Effect of Flooding Indices on Choice of Urban Migration Destination: Probit Estimate – All individual migrants

	Urban Migration Destination Probit Estimate	Distance to Migration Destination Ordinal Probit Estimate
Flooding Exposure Index	-0.039**	0.069***
	(-2.48)	(5.10)
Rainfall deviation (standardized)	-0.018	0.045***
	(-1.33)	(3.80)
Distance from River (standardized)	-0.006	0.050***
	(-0.45)	(4.43)
Province dummies	Yes	Yes
Controls – as listed in table 9	Yes	Yes
N	16490	16490

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix 6.5. Causal Effects of Flood Exposure Index, Flooding Anomaly Index and Flooding Anomaly Index-Squared on Household and Individual Migration

Table A6.5.1 Effects of Flooding Exposure and the degree of Flooding Anomaly on Any Household Migration: Probit Estimates

	(1)	(2)	(3)	(4)
Flooding Exposure Index	0.237***	0.212***	0.203***	0.198***
	(27.14)	(16.90)	(13.74)	(13.47)
Flooding Anomaly Index (FAI)	-0.033***	-0.028***	-0.033***	-0.033***
	(-3.27)	(-2.60)	(-3.33)	(-3.28)
FAI-squared	0.003	0.001	0.001	0.002
	(0.89)	(0.33)	(0.51)	(0.76)
Province dummies	-	Yes	Yes	Yes
Community Controls	-	-	Yes	Yes
Household Controls	-	-	-	Yes
N	7802	7802	7786	7767
pseudo R^2	0.2097	0.2411	0.2980	0.3081

Marginal effects; t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Standard Errors clustered at the community level
Community Controls: Urban/ Rural, topography, occupational characteristics, distance from administrative headquarters, social connectedness outside the community, intra-community linguistic fractionalization, community-level presence of infrastructure and state institutions, community-level adult education characteristics, community access to electricity, drainage, sex ratio
Household controls: Household size, Age of head, members' education levels, Farmland ownership, Number of rooms in the house, pre-flood livestock value, number of males, number of members over 14, household main occupation and enterprise ownership, female-headed (dummy), flood-induced displacement status

Table A6.5.2 Effects of Flooding Exposure and the degree of Flooding Anomaly on Any Individual^ Migration: Probit Estimates

	(1)	(2)	(3)	(4)
Flooding Exposure Index	0.246***	0.222***	0.202***	0.192***
	(59.49)	(36.18)	(25.26)	(23.81)
Flooding Anomaly Index (FAI)	-0.035***	-0.029***	-0.039***	-0.035***
	(-7.85)	(-5.40)	(-6.54)	(-5.94)
FAI-squared	-0.000	-0.003	-0.002	-0.002
	(-0.06)	(-1.41)	(-1.30)	(-1.17)

Province dummies	-	-	Yes	Yes
Controls	-	-	-	Yes
N	30697	30697	30623	30554
pseudo R^2	0.2324	0.2630	0.3073	0.3217

Marginal effects; *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
^ Estimated for all individuals aged 13 and above
Standard Errors clustered at the household level
Controls: In addition to the community and household-level controls listed in table 8, I control for individual characteristics – Age, Gender and Educational Attainment (categories)

Table A6.5.3 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Rural v/s Urban

	Total	Rural	Urban
Flooding Exposure Index	0.198***	0.195***	0.250***
	(13.47)	(12.78)	(7.72)
Flooding Anomaly Index (FAI)	-0.033***	-0.024**	0.039
	(-3.28)	(-2.50)	(0.85)
FAI-squared	0.002	0.000	-0.013
	(0.76)	(0.20)	(-0.73)
Province dummies	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes
N	7767	7049	684

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.5.4 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Land Ownership Status

	Total	Landless Households	Own-land cultivating Households	Rentier Landlord Households
Flooding Exposure Index	0.198***	0.181***	0.227***	0.243***
	(13.47)	(11.81)	(11.19)	(6.59)
Flooding Anomaly Index (FAI)	-0.033***	-0.028***	-0.047***	-0.015
	(-3.28)	(-2.86)	(-2.60)	(-0.47)
FAI-squared	0.002	-0.000	0.008*	0.004
	(0.76)	(-0.11)	(1.86)	(0.43)
Province dummies	Yes	Yes	Yes	Yes

Controls – as listed in table 8	Yes	Yes	Yes	Yes
N	7767	5208	2198	357

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.5.5 Effect of Flooding Exposure and Flooding Anomaly on Any HH Migration: Demographic Characteristics

	Total	Female Headed Households	Age of Household Head		
			Below 40	40 – 59	60 and above
Flooding Exposure Index	0.198***	0.209***	0.202***	0.186***	0.218***
	(13.47)	(9.06)	(11.09)	(10.97)	(11.01)
Rainfall deviation (standardized)	-0.033***	0.038*	-0.042***	-0.027**	-0.021
	(-3.28)	(1.84)	(-3.10)	(-2.46)	(-1.38)
Distance from River (standardized)	0.002	-0.005	0.002	0.000	0.004
	(0.76)	(-0.76)	(0.58)	(0.13)	(0.99)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 8	Yes	Yes	Yes	Yes	Yes
N	7767	720	3147	3220	1400

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the community level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.5.6 Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Gender

	Total	Male	Female
Flooding Exposure Index	0.192***	0.185***	0.200***
	(23.81)	(21.83)	(23.25)
Flooding Anomaly Index (FAI)	-0.035***	-0.035***	-0.036***
	(-5.94)	(-5.76)	(-5.62)
FAI-squared	-0.002	-0.002	-0.003
	(-1.17)	(-0.88)	(-1.35)
Province dummies	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes

N	30554	15227	15327

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.5.7. Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Age Group

	Total	Age Group			
		13 - 25	26 - 40	41 - 55	56 and above
Flooding Exposure Index	0.192***	0.187***	0.200***	0.175***	0.224***
	(23.81)	(19.15)	(19.50)	(15.31)	(15.28)
Flooding Anomaly Index (FAI)	-0.035***	-0.037***	-0.033***	-0.037***	-0.028***
	(-5.94)	(-4.84)	(-4.57)	(-4.48)	(-2.97)
FAI-squared	-0.002	-0.002	-0.002	-0.004	-0.000
	(-1.17)	(-1.01)	(-0.87)	(-1.35)	(-0.04)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes	Yes	Yes
N	30554	13016	7951	5749	3838

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.5.8 Effect of Flooding Exposure and Flooding Anomaly on Any Individual Migration: by Education Level

	Total	Education Level			
		Illiterate	Primary	Secondary	Higher
Flooding Exposure Index	0.192***	0.193***	0.191***	0.192***	0.160***
	(23.81)	(21.50)	(13.03)	(15.83)	(9.93)
Flooding Anomaly Index (FAI)	-0.035***	-0.042***	-0.018*	-0.026***	-0.039**
	(-5.94)	(-6.40)	(-1.73)	(-2.65)	(-2.56)
FAI-squared	-0.002	-0.003	-0.002	-0.002	0.001
	(-1.17)	(-1.43)	(-0.82)	(-0.86)	(0.22)
Province dummies	Yes	Yes	Yes	Yes	Yes
Controls – as listed in table 9	Yes	Yes	Yes	Yes	Yes
N	30554	19988	4210	4865	1490

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6.5.9 Marginal Effect of Flooding Indices on Choice of Urban Migration Destination: Probit Estimate – All individual migrants

	Urban Migration Destination Probit Estimate	Distance to Migration Destination Ordinal Probit Estimate
Flooding Exposure Index	-0.040**	0.077***
	(-2.51)	(5.73)
Flooding Anomaly Index (FAI)	-0.011	0.051***
	(-0.95)	(4.89)
FAI-squared	-0.004	0.012***
	(-0.91)	(3.12)
Province dummies	Yes	Yes
Controls – as listed in table 9	Yes	Yes
N	16490	16490

Marginal effects; *t* statistics in parentheses
Standard errors are clustered at the Household level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$